

CA 1  
MT 76  
- A66



# NATIONAL ENERGY BOARD REASONS FOR DECISION

In the Matter of Applications for Certificates  
of Public Convenience and Necessity under Part III  
of the National Energy Board Act

of

**Trans Mountain Pipe Line Company Ltd.  
and  
Foothills Oil Pipe Line Ltd.**

January 1980

3 1761 11708097 8





NATIONAL ENERGY BOARD

IN THE MATTER OF applications made by  
Trans Mountain Pipe Line Company Ltd.  
and Foothills Oil Pipe Line Ltd. for  
Certificates of Public Convenience and  
Necessity under Part III of the National  
Energy Board Act

Canada

2.  
1 NATIONAL ENERGY BOARD

3.  
1 REASONS FOR DECISION

In the Matter of Applications for Certificates  
of Public Convenience and Necessity  
under Part III of the National Energy Board Act

of

Trans Mountain Pipe Line Company Ltd.  
and  
Foothills Oil Pipe Line Ltd.

January 1980

Ce rapport est publié  
séparément dans les  
deux langues officielles





NATIONAL ENERGY BOARD

IN THE MATTER OF applications made by  
Trans Mountain Pipe Line Company Ltd.  
and Foothills Oil Pipe Line Ltd. for  
Certificates of Public Convenience and  
Necessity under Part III of the National  
Energy Board Act.

(Files: 1755-T4-15  
1755-F13-1)

HEARD AT Ottawa, Ontario on:

2, 3 and 4 October 1979.

HEARD AT Vancouver, British Columbia on:

15, 16, 17, 18, 19, 22, 23, 24, 25 and 26 October;  
5, 6, 7, 8, 9, 10, 12 and 13 November 1979.

B E F O R E:

R.F. Brooks  
J.R. Hardie  
J.L. Trudel

Presiding Member  
Member  
Member

APPEARANCES:

D.M.M. Goldie, Q.C.	)	
G.A. Irving	)	Trans Mountain Pipe Line
D.G.S. Rae	)	Company Ltd.
M. Moseley	)	
R.J. Gibbs, Q.C.	)	
J.W. Lutes	)	Foothills Oil Pipe Line Ltd.
C.W. Sanderson	)	
L.R. McCurdy	)	Interprovincial Pipe Line
	)	Limited
K.F. Keeler	)	Amoco Canada Petroleum Limited
W.S. Chan	)	Canadian Superior Oil Ltd.

(ii)

G.J. Gorman, O.C.	)	Dome Petroleum Limited
G.R. Robichon	)	
R.M. Perrin	)	Hudson's Bay Oil and Gas
	)	Company Limited
E.W. Keanleyside	)	Kaiser Oil Ltd.
F.J.D. Sayer	)	
E. Fitzhenry	)	
J.J. Marshall	)	Norcen Energy Resources
	)	Limited
D.G. Hart	)	PanCanadian Petroleum
	)	Limited
W.D. Mitchell	)	British Columbia Hydro and
	)	Power Authority
D.J. Gamble	)	Canadian Arctic Resources
F. Bregha	)	Committee
A. Roman	)	
M.S. Evans	)	Citizens' Pipeline Task Force
A. Dold	)	
S. Wilson	)	
B. Andrews	)	
D.J. Rosenbloom	)	Council for Yukon Indians
D. McCrea	)	
J. Aldridge	)	
A. Palmer	)	No Oilport
R. Salter	)	Union of British Columbia
B. Kuhne	)	Indian Chiefs
K. Roberts	)	West Coast Environmental
R. Jackson	)	Law Association
C. Stainsby	)	Scientific Pollution and
T. Pearce	)	Environmental Control Society
D. Anderson	)	B.C. Wildlife Federation
D. Flynn	)	Whitehorse Chamber of Commerce

(iii)

N.J. Schultz	) Yukon Conservation Society
A. Thompson	) A. Thompson
N. Bankes	)
A. Thomlinson	) United Fishermen and Allied Workers' Union
H.V. Doherty	) Clallam County, Washington
W.L. Nisbet, Q.C.	) Attorney General of Canada
W. Bilawich	) Government of Yukon
W. Grant	) Government of British Columbia
P.G. Griffin	) National Energy Board



TABLE OF CONTENTS

	<u>Page</u>
RECITAL	(i)
TABLE OF CONTENTS	(iv)
CHAPTER 1: THE APPLICATIONS	1-1
BACKGROUND	1-1
TRANS MOUNTAIN PIPE LINE COMPANY LTD.	1-5
FOOTHILLS OIL PIPE LINE LTD.	1-6
MOTIONS FOR ADDITIONAL INFORMATION	1-8
CHAPTER 2: CANADIAN SECTION	2-1
SUPPLY AND MARKETS	2-1
Supply	2-1
Evidence	2-1
Views of the Board	2-5
Markets	2-8
Evidence	2-8
Views of the Board	2-9
ROUTING, DESIGN AND FACILITIES	2-11
Routing and Design	2-11
Route and Rights-of-Way	2-11
Areas of Restricted Use	2-14
Views of the Board	2-16
Facilities	2-18
Pipeline and Ancillaries	2-18
Operations and Maintenance	2-21
Views of the Board	2-22
COST OF FACILITIES	2-24
Evidence	2-24
Views of the Board	2-26
FINANCIAL MATTERS	2-27
Evidence	2-27
Financial Parameters	2-27
Tariffs	2-30
Financing Plan	2-31
Views of the Board	2-32



	<u>Page</u>
SOCIAL AND ECONOMIC IMPACTS OF THE PROPOSED PROJECT	2-33
Regional Social and Economic Impacts	2-33
The Impact Region and Proposed Project	2-33
Impact on Local Employment and Regional Business	2-37
Impact on Primary, Secondary and Tertiary Economic Activities, Community Services and Facilities	2-38
Impact on the Indian Population	2-41
Views of the Board	2-42
COST BENEFIT ANALYSIS	2-46
Evidence	2-47
Views of the Board	2-56
CANADIAN CONTENT	2-60
Evidence	2-60
Views of the Board	2-62
ENVIRONMENTAL ASPECTS	2-64
Terrain and Land Use	2-65
Fisheries and Wildlife	2-70
Vegetation	2-72
Handling of Construction and Operating Materials	2-73
Environmental Mitigative Measures	2-76
Residual Impacts	2-77
Views of the Board	2-78
CHAPTER 3: INTERCONNECTING FACILITIES	3-1
UPSTREAM	3-1
DOWNSTREAM	3-2
CHAPTER 4: INTERNATIONAL AND MARINE CONSIDERATIONS	4-1
TANKER TRAFFIC AND THE TRANS MOUNTAIN PROJECT	4-3
VESSEL TRAFFIC MANAGEMENT	4-5
U.S. REGULATORY REQUIREMENTS	4-9
THE MARINE AND COASTAL ENVIRONMENT IN CANADA	4-12
VIEWS OF THE BOARD	4-15
CHAPTER 5: DECISION	5-1

Digitized by the Internet Archive  
in 2023 with funding from  
University of Toronto



## CHAPTER 1

### THE APPLICATIONS

By Order No. OH-1-79, the National Energy Board set down for public hearing two applications, one by Trans Mountain Pipe Line Company Ltd. ("Trans Mountain") and another by Foothills Oil Pipe Line Ltd. ("Foothills") for authorization to construct and operate oil pipelines to transmit crude oils for ultimate delivery to the landlocked northern states of Montana, North Dakota, Minnesota and Wisconsin of the United States of America ("U.S.").

### BACKGROUND

Historically, the north central states of Montana, North Dakota, Minnesota, and Wisconsin have been heavily dependent upon Canadian exports for their supplies of crude oils. Canadian exports of crude oils to the Northern Tier States<sup>(1)</sup> reached a level of some  $120 \times 10^3 \text{ m}^3/\text{d}$  (800 Mb/d) in 1974, when the Board commenced the reduction of Canadian crude oil exports because of declining domestic reserves of light crude oils. In late 1979, exports of Canadian light crude oils were virtually eliminated, except for exports made under crude oil exchange arrangements. Exports of Canadian heavy crude oils are continuing at approximately  $16 \times 10^3 \text{ m}^3/\text{d}$  (100 Mb/d).

---

1. The Northern Tier States are Washington, Oregon, Idaho, Montana, North Dakota, Minnesota, Wisconsin, Michigan, Illinois, Indiana and Ohio.

Note: Should there be a discrepancy between metric and imperial units, the metric units shall govern.

With the reduction of Canadian crude oil exports, refineries in Illinois, Indiana and Ohio were able to obtain alternative crude oil supplies from the midwestern and southwestern states and from the U.S. Gulf coast. Similarly, refineries on Puget Sound, in the State of Washington, were able to receive crude oils by tanker from Alaska and offshore sources to replace Canadian crude oils previously delivered over the existing Trans Mountain pipeline. The remaining Northern Tier States have not secured a satisfactory alternative source of crude oil, although some relief has resulted from Canadian exchanges. Refineries in these states have been given first priority by the U.S. Government to the remaining Canadian crude oil exports.

In 1968, substantial reserves of crude oils were discovered at Prudhoe Bay on the Alaska North Slope ("ANS"). In 1977, construction of the Alyeska pipeline system ("Alyeska") from Prudhoe Bay to Valdez was completed, and in June, 1977, that system commenced the delivery of some  $96 \cdot 10^3 \text{ m}^3/\text{d}$  (600 Mb/d) to Valdez. In the latter part of 1979, delivery of ANS crude oil to Valdez increased to some  $240 \cdot 10^3 \text{ m}^3/\text{d}$  (1 500 Mb/d).

Under the Trans Alaska Pipeline Act, by which the U.S. Congress authorized the construction of Alyeska, there are restrictions on the transportation and disposition of ANS crude oil. ANS crude oil must be sold in the U.S. and cannot be sold or transported to a foreign country. In addition, under present



U.S. legislation, ANS crude oil may only be transported between U.S. ports by American vessels. Since 1977, ANS crude oil has been shipped from Valdez by tanker to various refineries on the U.S. west coast, including the Puget Sound refineries in Washington. ANS crude oil which has been surplus to the requirements of the U.S. west coast refineries has been shipped by tanker through the Panama Canal to the U.S. Gulf coast for further delivery by pipeline to markets in the U.S.

Under Title V of the Public Utilities Regulatory Policies Act of 1978 ("PURPA"), the U.S. Congress has established the regulatory procedures applicable to the various proposals for transporting crude oils from the west coast to the landlocked Northern Tier States. This legislation provides that the President must select one or more of the west-to-east oil pipeline proposals for the purpose of an expedited federal permitting procedure. The President is required to make his selection by 6 December 1979, or within 60 days thereafter. The President's selection requires the approval of Congress. Once the selection procedure is completed by the President and Congress, it would likely take a year for the successful pipeline project to obtain all the required federal approvals.

For the purposes of the President's selection, various agencies of the U.S. Government have given consideration to the following pipeline proposals:

1. Northern Tier Pipeline Company: This project involves marine offloading and storage facilities at Port Angeles, Washington, and 2 400 km (1 491 miles) of 1 016 and 1 066 mm (40- and 42-inch) diameter pipeline extending across the northern U.S. to a terminal at Clearbrook, Minnesota.
2. Northwest Energy Company: This proposal, as submitted to the U.S. Government, includes marine offloading facilities at Skagway, Alaska, and some 1 127 km (700 miles) of 914 mm (36-inch) diameter pipeline from Skagway to Keg River, Alberta, to connect with existing pipelines.<sup>(1)</sup>
3. Trans Mountain Oil Pipe Line Corporation: This project consists of marine offloading and storage facilities at Low Point, Washington, and 1 325 km (823 miles) of 762 mm (30-inch) diameter pipeline through Washington, British Columbia and Alberta to Edmonton, where it would interconnect with existing oil pipelines extending to the Northern Tier.<sup>(2)</sup>

- 
1. This project is the Foothills project for which application was made to the Board for a certificate for the part of the pipeline to be built in Canada. The application to the Board was amended as noted herein.
  2. Trans Mountain Oil Pipeline Corporation is a wholly-owned subsidiary of Trans Mountain, which has applied to the Board for a certificate in respect of the Canadian portion of the project.



4. Kitimat Pipe Line Ltd.: This proposal involves a marine offloading and storage terminal at Kitimat, British Columbia, and approximately 1 212 km (753 miles) of 914 mm (36-inch) diameter pipeline through British Columbia and Alberta to connect with existing oil pipelines at Edmonton.<sup>(1)</sup>

In addition to the various federal regulatory approvals required under the procedures governed by PURPA, the Northern Tier and Trans Mountain projects also require various state regulatory approvals from the states within which the projects would be constructed. In Trans Mountain's case, such approvals would only be required in the State of Washington.

#### TRANS MOUNTAIN PIPE LINE COMPANY LTD.

Trans Mountain Oil Pipe Line Company was incorporated in 1951 by a Special Act of the Parliament of Canada, with authority to construct and operate interprovincial and international pipelines for the transmission of crude oil. In 1972, letters patent were issued under Part I of the Canada Corporations Act continuing the Company under the name of Trans Mountain Pipe Line Company Ltd.

- 
1. In December 1976, Kitimat Pipe Line Ltd. applied to the Board for a certificate for a 762 mm (30-inch) diameter pipeline from Kitimat to Edmonton, but has requested the Board not to set the application down for hearing until requested by that Company. The Kitimat application has not been amended to make it consistent with the 914 mm (36-inch) diameter pipeline proposal submitted to the U.S. authorities.

By an application dated 12 April 1979, Trans Mountain applied for a certificate under section 44 of the National Energy Board Act ("NEB Act") authorizing the construction and operation of a crude oil pipeline within its existing right-of-way, commencing at the international boundary near Sumas, Washington and terminating at Edmonton, Alberta, for interconnection with existing crude oil pipeline facilities. At the international boundary, the pipeline would connect with facilities to be constructed by Trans Mountain Oil Pipe Line Corporation from Low Point, Washington. Crude oils from Alaska and offshore sources would be supplied to the pipeline by tankers to be offloaded at Low Point on the Strait of Juan de Fuca.

In Canada, Trans Mountain proposes to construct 927 km (576 miles) of 762 mm (30-inch) diameter pipeline adjacent to the Company's existing pipeline. The complete pipeline in Canada, including the two existing loops, would be 1 089 km (676.7 miles).

FOOTHILLS OIL PIPE LINE LTD.

Foothills Oil Pipe Line Ltd. was incorporated on 12 May 1978 under the Canada Business Corporations Act.

By an application dated 24 April 1979, Foothills applied for a certificate under section 44 of the NEB Act authorizing the construction and operation of the Canadian section of a crude oil pipeline extending from the port of Skagway,



Alaska, to Keg River, Alberta, where it would interconnect with existing crude oil pipeline systems. In Canada, the proposed Skagway to Keg River pipeline would be 1 121 km (696 miles) long and would incorporate 914 mm (36-inch) and 964 mm (34-inch) pipe. A significant portion of this pipeline would generally parallel the route of the Alaska Highway Gas Pipeline and be located either in or adjacent to the right-of-way of that gas pipeline.

In its application, Foothills indicated that it was giving consideration to two alternative routes for the proposed crude oil pipeline. These alternative routes were:

- (i) to commence the pipeline at a point on the Alyeska Pipeline near Delta Junction, Alaska, and to generally parallel the route of the Alaska Highway Gas Pipeline to Johnsons Crossing in the Yukon and terminating at Keg River; and
- (ii) to extend the originally proposed pipeline to Edmonton if the use of the existing pipelines between Keg River and Edmonton proved impractical.

In August 1979, Foothills advised the Board that it wished an extension of its proposed pipeline in a direct line from Fort Nelson, British Columbia, to Edmonton to be its prime route with respect to the southern end of the pipeline, in place of the Keg River proposal. In September 1979, Foothills further advised the Board that it was the Company's intention only to lead evidence in respect of, and to seek a certificate for, a pipeline following the all land route from Delta Junction to Edmonton.

By a letter dated 26 September 1979, the Board requested Foothills to address, at the commencement of the hearing, the issue of whether its application for the Delta Junction to Edmonton pipeline contained sufficient information to be considered in a public hearing.

#### MOTIONS FOR ADDITIONAL INFORMATION

At the commencement of the hearing of the Trans Mountain and Foothills applications in Ottawa, on 2 October 1979, the Board heard two motions by the Council for Yukon Indians for an order directing Foothills to file additional pipeline design and environmental information, including a full description of the combined and cumulative environmental and socio-economic impacts of constructing and operating the proposed oil pipeline in the same corridor as the Alaska Highway Gas Pipeline. The Council further requested that the hearing of the Foothills application be adjourned pending the filing of that information.

On 4 October 1979, the Board gave its decision on the Council for Yukon Indians' motions and ordered Foothills, in accordance with the National Energy Board Rules of Practice and Procedure, to file additional engineering, financial, environmental and socio-economic information with respect to the Canadian section of the proposed Delta Junction to Edmonton pipeline. The Board adjourned the hearing to resume in Vancouver on 15 October 1979 to deal with the Trans Mountain application. The Board further indicated that it would proceed

with the hearing of the Foothills application after the required information had been filed.

At the commencement of the hearing in Vancouver, Foothills requested the Board not to proceed with a public hearing of its application, and not to set it down for hearing unless and until so requested by Foothills. The Company also asked the Board to grant it status as an intervenor in the hearing of the Trans Mountain application. The Board granted both these requests.

On 16 October 1979, the Board heard a motion by the West Coast Environmental Law Association for an order requiring Trans Mountain to comply with the requirements for environmental information set out in Part VI of the Schedule to the National Energy Board Rules of Practice and Procedure. The Association further requested an adjournment of the hearing until 30 days after the filing of that environmental information. In argument, the Association indicated that its primary concern was the absence of any environmental information relating to the consequences on the marine and coastal environment which might result from the existence of tanker traffic and the crude oil port and related facilities in the U.S.

In its decision rendered on 18 October 1979, the Board ruled that its jurisdiction under Part III of the NEB Act was limited to pipelines within the meaning of section 2 of the NEB Act which are located in Canada. The Board further indicated



that the environmental information required under Part VI of the Rules of Practice and Procedure only applied to a pipeline over which the Board has jurisdiction under the NEB Act. As a result, the motion was dismissed. In its decision, the Board stated:

"While the Board has no jurisdiction over the tanker traffic and the oil port and other facilities outside Canada, the Board does have the obligation, when considering an application under section 44, to take into account all matters which appear to it to be relevant. The existence of the proposed oil port in Washington and the movement of crude oil by tanker from Alaska to that port, together with its effects upon existing tanker traffic and potential effects upon the marine and coastal environment, are issues having a bearing upon the overall Canadian public interest in relation to the pipeline in Canada proposed by Trans Mountain. The Board considers these matters relevant to its decision on whether to issue a certificate to Trans Mountain for the pipeline in Canada. There are, however, no information requirements in the Board's Rules of Practice applicable to those issues.

The essential burden of establishing its case for a certificate under section 44 lies upon Trans Mountain. That burden would extend, in the circumstances of this case, to the matters affecting the marine and coastal environment in Canada, which the Board considers to be relevant issues."





## CHAPTER 2

### CANADIAN SECTION

#### SUPPLY AND MARKETS

##### Supply

##### Evidence

Trans Mountain's analysis of supply was based on discussions it had with ANS producers and the United States Department of Energy ("DOE"). To support its supply projections, Trans Mountain relied heavily on an official DOE report prepared under the direction of Mario Cardullo and entitled Supply Alternatives for Northern Tier and Inland States - 17 October 1979. The report discussed two supply scenarios, low and high, which are summarized in Table 1. The high case is an extension of the low case with additional supplies from the Beaufort Sea and onshore areas.

Table 1

U.S. DEPARTMENT OF ENERGY  
FORECAST OF ALASKAN CRUDE OIL PRODUCTION

$10^3 \text{ m}^3/\text{d}$   
 (Mb/d)

Components	1980	1985	1990	1995	2000
North Slope Prudhoe Bay <sup>a</sup>	238 (1 500)	238 (1 500)	175 (1 100)	80 (500)	48 (300)
Other <sup>b</sup>	0 (0)	8 (50)	87 (550)	87 (550)	87 (550)
Southern Alaska <sup>c</sup>	18 (115)	24 (150)	24 (150)	24 (150)	24 (150)
Total (Low Case)	256 (1 615)	270 (1 700)	286 (1 800)	191 (1 200)	159 (1 000)
Beaufort Sea and onshore areas <sup>d</sup>	0 (0)	0 (0)	64 (400)	238 (1 500)	238 (1 500)
Total (High Case)	256 (1 615)	271 (1 700)	350 (2 200)	429 (2 700)	397 (2 500)

a. State of Alaska Department of Natural Resources prediction of Reservoir Fluid Recovery Sadlerochit formation, Prudhoe Bay Field - Supplement, proposed by H.K. Van Poollen and Associates, February 1977.

b. DOE estimate for Kuparuk and Flaxman Island.

c. DOE estimate.

d. Estimate assumes finding  $1\,590 \times 10^6 \text{ m}^3$  (10 000 MMb) of additional reserves.

It was Trans Mountain's opinion that the true supply position would likely be somewhere between the high and low scenarios with a medium to low case as the most probable. The Applicant agreed with the projections of DOE and Sohio indicating that Prudhoe Bay production would drop off sharply after 1985. However, the Applicant was of the opinion that additions to reserves and production in Alaska would largely replace this drop off.

The Applicant expected that initially  $47.7 \times 10^3 \text{ m}^3/\text{d}$  (300 Mb/d) of its projected throughput would be ANS crude oil and the remaining  $15.9 \times 10^3 \text{ m}^3/\text{d}$  (100 Mb/d) would be obtained from foreign offshore sources. Currently, approximately  $64 \times 10^3 \text{ m}^3/\text{d}$  (400 Mb/d) of ANS crude oil is surplus to U.S. west coast requirements. Despite predicted increases in production, it was Trans Mountain's assessment that ANS crude oil surplus to U.S. west coast requirements would start to decrease after 1985 from the current  $63.6 \times 10^3 \text{ m}^3/\text{d}$  (400 Mb/d) to approximately  $40 \times 10^3 \text{ m}^3/\text{d}$  (250 Mb/d) by 1990 and disappear altogether in the succeeding decade. If less than  $47.7 \times 10^3 \text{ m}^3/\text{d}$  (300 Mb/d) of ANS crude oil were available for the Applicant's system, Trans Mountain anticipated that additional crude oils would be available from foreign offshore sources.



PanCanadian, in its intervention, used estimates made public by Standard Oil of Ohio ("Sohio") regarding the volumes of ANS crude oil surplus to U.S. west coast requirements which would be available to Northern Tier refiners. Sohio's findings are summarized in Table 2.

Table 2

SOHIO FORECAST OF ALASKAN CRUDE OIL  
SURPLUS TO WEST COAST REQUIREMENTS

<u>Year</u>	<u>Prudhoe Bay</u> <u>ANS Production</u>		<u>West Coast</u> <u>ANS Disposal</u>		<u>Surplus</u>	
	$10^3 \text{ m}^3/\text{d}$	Mb/d	$10^3 \text{ m}^3/\text{d}$	Mb/d	$10^3 \text{ m}^3/\text{d}$	Mb/d
1980	211	(1330)	153	(960)	59	(370)
1981	215	(1350)	156	(980)	59	(370)
1982	237	(1490)	159	(1000)	78	(490)
1983	239	(1500)	162	(1020)	76	(480)
1984	239	(1500)	165	(1040)	73	(460)
1985	239	(1500)	168	(1060)	70	(440)
1986	231	(1450)	170	(1070)	60	(380)
1987	216	(1360)	170	(1070)	46	(290)
1988	199	(1250)	170	(1070)	29	(180)
1989	180	(1130)	170	(1070)	10	(60)
1990	161	(1010)	170	(1070)	-	-

This forecast predicted only the amount available from the Sadlerochit Pool and did not take into account discovered Alaskan fields which are about to be developed nor did it assume future potential discoveries.

PanCanadian made reference to the United States government's policy of trying to increase California heavy

crude oil production by 32 to 48  $10^3 \text{ m}^3/\text{d}$  (200 to 300 Mb/d) by 1985. If this crude oil were mixed with near equal quantities of imported light crude oils it would have the potential to back out of U.S. west coast markets approximately 68  $10^3 \text{ m}^3/\text{d}$  (425 Mb/d) of ANS crude oil, some of which could then become available to Northern Tier refiners. PanCanadian also believed that additional sources would materialize in Alaska and that crude oils from these sources would be of ANS crude oil quality.

#### Views of the Board

Most of the evidence on supply presented at the hearing was derived from the United States DOE report Supply Alternatives for the Northern Tier and Inland States - 17 October 1979. The two official supply scenarios presented in this report (low and high), Table 1, take into account future producibility of the Kuparuk River and Flaxman fields as well as producibility from the established fields of the Alaskan north slope together with those of Southern Alaska. However, in the more optimistic scenario (high case), potential producibility from unexplored areas is also included. Although the United States Department of the Interior is currently evaluating the crude oil and gas potential of these relatively unexplored areas, no firm data as to future producibility and reserves has as yet been published.

After examining the DOE report and the Sohio report presented by PanCanadian, which tends to substantiate this conclusion, the Board accepts the conclusion that Prudhoe Bay production is likely to drop off some 10 per cent per year after 1985. Future reserves and producibility from the Kuparuk River field and fields in the southern Alaska may offset declining producibility from the Prudhoe Bay field after 1985 but probably to a lesser extent than that predicted in the DOE report.

In regard to future additions to reserves and producibility from the Beaufort Sea and onshore areas, the Board recognizes the uncertainties inherent in estimating potential reserves and producibility from such relatively unexplored areas. The Board, therefore, considers it more reasonable at this time, to accept the low case scenario of the official DOE supply forecast as a basis for evaluating the feasibility of the Applicant's proposal. In so doing, however, it does not rule out the possibility of the existence of substantial amounts of ANS crude oil to be discovered in the Beaufort Sea and onshore areas of Alaska, which, if discovered, would help offset declining producibility from the Prudhoe Bay and other existing fields in Alaska.



Under the low case scenario, available supply of ANS crude oil would only marginally sustain the viable operation of the Trans Mountain west to east pipeline through its projected lifetime while at the same time continuing to meet the increasing demand of U.S. west coast refiners. However, the Board takes cognizance of PanCanadian's testimony that heavy crude oil production in California could be increased substantially before 1985. This increased production has the potential of backing out as much as  $71.5 \times 10^3 \text{ m}^3/\text{d}$  (450 Mb/d) of ANS crude oil from west coast markets and presumably some of this would become available for Northern Tier refiners.

Based on the low case scenario of the official DOE supply forecast and PanCanadian's evidence that additional production of California heavy crude oil could back out some ANS crude oil from California markets, the Board accepts that supplies should be adequate to sustain the projected throughput of  $47.7 \times 10^3 \text{ m}^3/\text{d}$  (400 Mb/d) of ANS crude oil throughout the economical lifetime of the Trans Mountain proposal. While shortfalls in projected supply of ANS crude oil could develop during the latter stages of the pipeline's operation, the Board accepts that the shortfalls could be offset by additional supplies from offshore sources.

MarketsEvidence

Information was submitted concerning market sectors in the Northern Tier and mid-west areas of the United States that would be served by Trans Mountain's proposed system. PanCanadian submitted data regarding refineries in the Northern Tier and mid-west states including their capacities and, of more importance from its standpoint, their abilities to process heavy crude oil.

Trans Mountain's forecast of initial throughput in its west to east proposed system was  $63.5 \times 10^3 \text{ m}^3/\text{d}$  (400 Mb/d). The areas to be served would be the states of Montana, North Dakota, Minnesota, Wisconsin, Illinois, Indiana and Ohio. These areas had in the past been partially supplied by crude oil imported from Canada.

Trans Mountain conceded that Koch's intention to build a pipeline to connect Minnesota refineries with the U.S. mid-west pipeline systems would impact on Trans Mountain throughputs. The Applicant indicated that it had considered the Koch proposal in coming to its initial estimate of  $63.5 \times 10^3 \text{ m}^3/\text{d}$  (400 Mb/d) throughput volumes.

PanCanadian, while not opposed to the Trans Mountain proposal, submitted that the Canadian Government should seek to include safeguards on a quid pro quo basis that would not cause the production of surplus Canadian heavy crude oil to be shut in. In its view, U.S. Northern Tier refiners would view domestic north slope crude oil as being a more secure source of supply than Canadian heavy crude oil.

#### Views of the Board

It is the view of the Board that potential markets exist in the Northern Tier, in the mid-west and in western New York to substantiate the throughput forecasts submitted by Trans Mountain. The Board believes that, rather than present supply arrangements, U.S. refineries would likely prefer to receive supplies through Canada, because the proposal would cut transit times and reduce freight costs for Alaskan and offshore crude oils arriving in these areas. Additionally, this proposal could supplement the present capability to receive offshore crude oils thus reducing dependence on pipelines from the U.S. Gulf coast.

As to throughputs which would materialize in Trans Mountain's proposed pipeline, this would depend upon commercial decisions by many companies with refineries in the northern United States. At present, refining capacity, connected with Canadian pipeline systems, in Montana, North Dakota, Minnesota, and Wisconsin, and in the Chicago, Toledo, Detroit and Buffalo areas totals some  $285 \times 10^3 \text{ m}^3/\text{d}$  (1 800 Mb/d).



The Board has considered the concern expressed by PanCanadian and others that access to alternate sources of crude oil through Canada would unduly impact on the ability to market surplus Canadian heavy crude oil in the United States. It is the Board's view that the surplus volume would be small compared to the total demand in the areas to be served. If Canadian markets were included, there would be a total of some  $475 \times 10^3 \text{ m}^3/\text{d}$  ( $3 \text{ 000 Mb/d}$ ) of refinery capacity to which Canadian heavy crude oil would have access. The major factors which will determine if this oil can be sold will be its price and its supply reliability.

In the past, Canadian heavy crude oil has been competitively priced with foreign crude oils in the U.S. heavy crude oil market. There is no reason to believe that this competitiveness would change. Moreover, the quality of Canadian heavy crude oils make them attractive in the market place.

Therefore, in the Board's view, the safeguards proposed by PanCanadian would not be necessary to allow for continued sale of Canadian heavy crude oils. The Board does, however, recognize that heavy crude oil will become increasingly important in meeting Canada's crude oil needs and the Board will continue to strongly encourage development of this resource.

## ROUTING, DESIGN AND FACILITIES

### Routing and Design

#### Route and Rights-of-Way

The Applicant indicated that the proposed pipeline would be built within the existing Trans Mountain right-of-way, except for minor deviations where the existing right-of-way would not allow the installation of additional line pipe because of unfavourable physical conditions or restrictions caused by other existing or proposed installations. It was estimated by the Applicant that deviations from the existing right-of-way would amount to less than two per cent of the length of the present right-of-way.

The Applicant indicated that the most extensive route change would occur south of Edmonton, where the proposed pipeline would follow the south side of the "Edmonton Service Corridor" which has been set aside for all linear development around that city.

The Applicant also anticipated two further major deviations: one at the top of the Coquihalla River Valley, where rerouting is proposed along an abandoned railway bed, and the other at Windy Point in Jasper National Park, where the present right-of-way negotiates a steep bank and rerouting is proposed by tunnelling the rock bank and following an abandoned railway bed.

With reference to the proposed deviation at Windy Point in Jasper National Park, Parks Canada has stated that its policy does not permit new utility corridors to be routed through national parks. Thus, the deviation at Windy Point would be contrary to existing policy for Jasper National Park. Trans Mountain's witness testified that the proposed pipeline could be constructed on the existing right-of-way in the area of Windy Point and that it would be prepared to do so if required. The Applicant also stated that should Parks Canada require any minor deviation, it was prepared to meet such requests.

As to other deviations, it was stated that some might arise during final design or construction but that these would involve only minor realignments.

Trans Mountain's proposed pipeline would be located within its existing right-of-way which is 18.29 m (60 feet) in width for the majority of its length. One exception to this width is the 6.1 m (20-foot) right-of-way in Jasper National Park.

The Applicant stated that a high proportion of existing easements permit the construction of additional



pipelines within the right-of-way boundaries. Trans Mountain submitted a list of properties through which multiple pipeline easements do not exist. These areas include Jasper National Park, as well as twelve privately owned properties at various locations in the Province of British Columbia.

The proposed pipeline would cross twelve Indian Reservations. In some of these, multiple pipeline easements are not held. The twelve Reservations were identified as follows:

Tzeachten	Coldwater #1
Grass	Joeyaska
Popkum	Zoht #1 or 4
Peters	Zoht #2 or 5
Ohamil	Whispering Pines
Kawkawa	Gilead

A witness for the Applicant testified that it would negotiate with those Bands where authorization does not exist for construction of the proposed pipeline alongside the existing 610 mm (24-inch) diameter pipeline. If agreement could not be reached, minor route relocations would be proposed.

Trans Mountain stated that it would be necessary, in some cases, to negotiate a change of use from that contemplated in existing right-of-way agreements to allow further construction to take place. It was not expected that such change would have an impact on Indian land significantly different from that on other lands.

Trans Mountain indicated that it would require temporary working rights 6 to 8 m (20 to 26 feet) in width during the construction phase. However, the existing 18.29 m (60-foot) right-of-way would be sufficient for maintenance.

Through Jasper National Park, Trans Mountain would require 13 to 14 m (42 to 46 feet) of right-of-way width during the construction phase. Trans Mountain stated that the existing 6.1 m (20-foot) right-of-way would be sufficient for normal inspection and maintenance.

Land in fee simple would be required for five pump stations; the other eight would be built on land within existing pump station sites.

#### Areas of Restricted Use

Trans Mountain identified and listed a number of provincial parks and park reserves which would be traversed by the proposed pipeline. Its witness testified that it had not contacted the appropriate provincial agencies and thus was unaware of any objections to the proposed construction relating to these provincial parks and park reserves.

The Applicant identified a potential problem area along the proposed four lane highway between the town of Hope and Boston Bar Creek in the Coquihalla Canyon in British Columbia. There is some concern that the location of the pipeline may restrict or constrain plans for future widening

or upgrading of the highway. Trans Mountain's witness testified that it had held numerous discussions with the Ministry of Highways and Public Works of the Province of British Columbia about its routing and, in more recent times, about its construction activities.

Trans Mountain gave evidence that it was not aware of any mining areas that would be crossed by its proposed pipeline. It said that it had heard that mining claims were being staked in the Kamloops area of British Columbia but had not investigated these claims and was not aware of any potential impact resulting from those stakings.

Trans Mountain stated that, where registered trap lines exist along the right-of-way, it was its policy, to the extent possible, to take steps to advise licensees of pipeline activities. Arrangements would be made with the licensees to settle compensation for monetary loss resulting from the disruption of trap line activities.

The Applicant estimated that approximately three per cent of the trench will be in rock cut, requiring the use of select granular backfill. All granular backfill required for the proposed construction would be obtained either from existing gravel pits or from such new pits as may be approved by the proper authorities. Trans Mountain also stated

that it had no intention of using any gravel taken from lakes or streams.

Views of the Board

The Board is satisfied with Trans Mountain's proposal to make use of its existing right-of-way including the minor deviations. It is also satisfied that the deviation at Edmonton, utilizing the "Edmonton Service Corridor", would add to the safety and integrity of the pipeline in a rapidly expanding urban area.

The Board further agrees with the deviation at the Coquihalla River Valley to protect the existing 610 mm (24-inch) diameter pipeline of the Applicant.

Although the Applicant has proposed another deviation at Windy Point in Jasper National Park, the Board notes that further negotiations would be required with Parks Canada to determine the desirability of such a deviation as an alternative to construction within the existing right-of-way. The Board considers that a resolution of this matter could be achieved without undue difficulty.

While the Board recognizes that a high proportion of existing easements permit the construction of additional pipelines within the existing right-of-way, the Board would want to be kept informed of negotiations for second line rights in the remaining areas.



The Applicant satisfied the Board that appropriate negotiations had taken place, and would continue, with the Ministry of Highways and Public Works of the Province of British Columbia. The Board is also satisfied that the construction of both the pipeline and the highway through the Coquihalla Pass could be accommodated.

The Board accepts the Applicant's undertakings respecting trap lines as described in the evidence and accepts that minimum impact on trappers should occur.

The Board recognizes the Applicant's statement that it is unaware of any active mining areas along its existing right-of-way. Nevertheless, the right-of-way could be affected by mining claims, and in the event a certificate were issued, the Board would require, under section 35 of the Act, that Trans Mountain indicate, on any plans and profiles filed pursuant to section 29, the existence of any mining claims along the proposed route of the pipeline. Since the route of the proposed pipeline is to be in the right-of-way of the existing Trans Mountain pipeline, section 70 of the Act would be applicable to prohibit any mining or prospecting for minerals within 12 m (40 yards) of the existing pipeline without leave of the Board being obtained.

The Board is satisfied that the project would require only relatively small quantities of borrow material and views the likely impact in this respect as minimal.

### Facilities

#### Pipeline and Ancillaries

The 927 km (576 miles) of proposed new pipeline plus the two existing 81 km (50-mile), 762 mm (30-inch) diameter loops, would provide a 1 089 km (676.7 mile), 762 mm (30-inch) diameter pipeline within Canada. The proposed pipeline would connect at the international boundary with a pipeline proposed to be constructed in the State of Washington by Trans Mountain Oil Pipe Line Corporation. At Edmonton, the pipeline would be connected to the facilities of Interprovincial Pipe Line Limited, which connects with other pipeline systems in Canada and the U.S.

Depending on operating conditions, the wall thickness of the proposed pipeline would vary considerably along its length. The minimum wall thickness would be 7.92 mm (0.312 inch). The maximum wall thickness would be 15.88 mm (0.625 inch) which would be for the pipe located immediately downstream of Lear Pump Station. All new line pipe would be manufactured to conform with CSA Standard Z245-2 "High Strength Steel Line Pipe 18 Inches or Larger in Diameter" for Category I, Grade 60. The line pipe of the two

existing 81 km (50-mile) loops was manufactured in accordance with API specifications 5LX.

Trans Mountain proposes to install thirteen pump stations in the system in Canada, nine in British Columbia and four in Alberta. Six of the pump stations would be electrically powered, four diesel powered and three dual-fuel powered. Eight of the stations would be located at the sites of existing stations; the remaining five stations would be constructed at new site locations. Total new installed capacity would be 114 940 kW (151 237 HP).

All new facilities would be designed, constructed and operated in accordance with CSA Standard Z183 Oil Pipeline Transportation Systems and the National Energy Board's Oil Pipeline Regulations. In the event of a conflict, the latter would govern.

The pipeline would be designed for a throughput of  $79.5 \times 10^3 \text{ m}^3/\text{d}$  (500 Mb/d) with a maximum capacity of  $100 \times 10^3 \text{ m}^3/\text{d}$  (630 Mb/d). To reach maximum capacity additional pump stations would be required.

Main-line valves would be installed at suitable intervals, not exceeding 30 km (18.64 miles), and at both sides of every major water crossing. At pumping stations, valves would be installed to isolate the pumping facilities from the main line piping. Check valves may be installed

to prevent backflow during shut-down or in the event of a rupture. These check valves would typically be located on the downstream side of river crossings and on long uphill sections.

No new tankage would be required in the Canadian section of the pipeline.

Trans Mountain commissioned a study of pressure surges and associated requirements for pressure relief and pressure control installations in the pipeline system. It was concluded that with certain modifications the proposed pipeline system could be operated at the design flow of  $3.48 \times 10^3 \text{ m}^3/\text{hr}$  (21.89 Mb/hr) and the loss of any of the pump stations would not result in exceeding the maximum operating pressure of the system.

Trans Mountain stated that average oil temperatures would be about 13°C (55°F) in winter and about 21°C (70°F) to 22°C (72°F) in summer. Since ANS crude oil is in the Newtonian state above 10°C (50°F), it was confirmed that there would be no problem at the oil flowing temperatures between 13°C (55°F) and 22°C (72°F). Trans Mountain also confirmed that it did not foresee any problem of restarting the pipeline if, for some reason, it were stopped during the winter.



Operations and Maintenance

An operations and maintenance program is now in place for the existing 610 mm (24-inch) diameter line and the procedures for that line were filed as evidence. Trans Mountain contended that there would be no significant changes required to adapt these procedures to the proposed 762 mm (30-inch) diameter line.

It is estimated that the stabilization period for the pipeline right-of-way would be from three to five years. Provision has been made by Trans Mountain for extra staffing for stabilization work. The Applicant believes that the experience of its present personnel would contribute significantly towards the training of new support people.

Trans Mountain stated that it has had good relations with Parks Canada in the past and expected no difficulty in complying with that body's requirements for this project. Such requirements are anticipated to be compatible with normal procedures for operation and maintenance of the facility.

Scheduling, batch tracking and similar programs would be controlled from a master or control computer located in Vancouver. Surge control would be provided by station shut down through high pressure sensors at all stations and, where necessary, through surge relief valves into tanks.

The pipeline system would be supplied with a reliable, high speed-of-response communication and control system. Microwave voice channels would be leased to provide communications of the highest reliability. Fast and reliable control would be provided, first by a computer-assisted supervisory control system for the pipeline, and secondly by a station control system capable of station operation and protection on its own, in the event that communications were lost.

It is the intention of Trans Mountain to use as sophisticated a leak detection system as is available. This leak detection system would be supplemented by helicopter line patrols which are now flown on a weekly basis between Edmonton and Vancouver. In the event of a leak, personnel, equipment and set procedures would be available to handle the spill in the most expeditious manner available.

#### Views of the Board

The Board is satisfied that:

- (i) the design of the pipeline is adequate for throughputs proposed by the Applicant;
- (ii) crude oil flowing temperatures would be sufficiently high during winter conditions to maintain required flows without undue increases in power requirements;

- (iii) if the pipeline flow were stopped for any reason during winter conditions, restarting would pose no foreseeable problem;
- (iv) the throughput capacity of the pipeline could be increased to  $100 \times 10^3 \text{ m}^3/\text{d}$  (630 Mb/d) by the future addition of pumping facilities;
- (v) adequate and properly designed communication and control systems would be designed and installed to maintain maximum safety and operational control of the system; and
- (vi) the Applicant has had a competent and adequate study conducted to ensure that overpressuring of the system would not occur due to pressure surges.

The Board expects that sufficient and properly located shut-off valves and check valves would be installed in the pipeline to maintain maximum safety and minimize crude oil losses and contamination of the environment in the event of a leak or rupture and would condition any certificate to require the installation of those valves.

COST OF FACILITIESEvidence

The Applicant's revised capital cost estimate of \$478 575 000 for the project, in 1979 dollars<sup>(1)</sup>, can be summarized in the following manner:

Pump stations	\$ 59 038 000 <sup>(2)</sup>
Pipelines	274 688 000
Miscellaneous	900 000
	<u>334 626 000</u>
Engineering management (4 per cent)	13 385 000
	<u>348 011 000</u>
Contingencies (10 per cent)	<u>34 801 000</u>
Total expenditures	382 812 000
Assets transferred from existing pipeline	53 150 000
	<u>435 962 000</u>
Interest during construction	
- borrowed funds	36 907 000
- equity funds	<u>5 706 000</u>
Gross plant	<u>\$478 575 000<sup>(2)</sup></u>

1. Unless otherwise stated, all dollar amounts shown in the report relate to the Canadian section of the total project and are expressed in 1979 Canadian dollars.
2. Amount does not include approximately \$5 million in additional estimated costs for station equipment resulting from the substitution of a diesel station for an electrical station at Darfield, B.C.



The revised estimated cost for gross plant differs from the original estimate of \$408 001 000 shown in the financial information submitted with the application, for three reasons.

Firstly, the initial estimate did not include the amount of \$53 150 000 for the value of the assets of the existing pipeline system which would be transferred to the new project. These would include the two existing 81 km (50-mile) loops of 762 mm (30-inch) diameter pipe. The assets to be transferred were valued on the basis of an estimate of the cost to build those facilities new as if the existing facilities were not in place.

Secondly, the value of interest during construction on borrowed funds that was capitalized increased from \$25 189 000 to \$36 907 000. This increase was occasioned by the increase of the cost base on which the interest was calculated and a change in the rate of interest used from 10.75 per cent to 11.5 per cent due to a general increase in interest rates that has occurred since the application was filed.

Finally, the Applicant capitalized, as interest during construction, \$5 706 000 as an allowance on equity funds used during construction.

In support of its capital cost estimates the Applicant pointed out to the Board that the construction was proposed along a route with which it had intimate familiarity and on the basis of 1979 material and pipeline construction costs.

One intervenor maintained in argument that the capital cost estimates were not realistic; the intervenor had made a random selection of cost items to be queried and felt the Applicant's responses were inadequate.

Views of the Board

The Board is of the opinion that the Applicant's estimate of the capital costs for this proposal is proper and reasonable.

As referred to under "Financial Matters", the Board accepts the Applicant's valuation of the existing assets to be transferred to the proposed project for financing purposes only. This acceptance would not, however, bind the Board in any later determination of the value to be placed on these assets for rate base and rate-making purposes.

FINANCIAL MATTERSEvidence

In support of its application to construct facilities described earlier in this report, the Applicant provided information with respect to its financial responsibility and pro forma statements of carrier revenues and expenses for the first 15 years of operations.

Financial Parameters

The Applicant submitted revised financial analyses based on the following parameters:

Throughput	79.5 $10^3 \text{ m}^3/\text{d}$ (500 Mb/d)
Economic life	15 years
Debt retirement period	10 years
Interest on debt	11.5 per cent
Debt/Equity ratio	90/10
Return on rate base	13.5 per cent
Exchange rate \$1 Canadian =	\$0.85 U.S.

Pipeline facilities were designed to accommodate a flow of  $79.5 \times 10^3 \text{ m}^3/\text{d}$  (500 Mb/d) from the international boundary to Edmonton.

Much of the cross-examination centred upon the question of the availability of crude oil supply from Alaska for the proposed project. While discussions have been held with potential users of the pipeline, Trans Mountain had not yet requested or received any signed throughput contracts or deficiency agreements. The revised project is based on a 15-year amortization period and a 10-year debt retirement period. Witnesses for the Applicant stated that the uncertainty of the Alaskan oil supply made it prudent to adopt a 10- year debt retirement plan which, in their opinion, would be attractive to the investors while maintaining the competitive advantages offered by Trans Mountain.

On 21 September 1979, the Applicant submitted its revised material in support of its project. The cost of debt was then estimated to be 11.5 per cent. The Company's financial adviser stated that this figure was based on the composite credit rating of the parties expected to provide the throughput and/or deficiency agreements and reflected their stature in the market place. The actual cost of debt would reflect going rates of interest at the time that financing was actually undertaken.



The initial debt/equity ratio of 75/25 was changed to 90/10 in the revised financial data submitted to the Board. The financial advisers to Trans Mountain were of the opinion, based on their experience, that, if the Applicant could obtain "tight" throughput and/or deficiency agreements, lenders would provide financing on a 90/10 ratio.

To the maximum extent possible the required \$429.3 million debt financing, including interest during construction on borrowed funds, relating to the Canadian section of the pipeline, would be raised in the Canadian capital market by a combination of private placements, public issues and bank financing. The Applicant further stated that this debt financing would have to be supported by throughput and/or deficiency agreements yet to be obtained from potential users together with a mortgage on the physical assets.

The equity financing for the \$43.6 million required for the Canadian portion of the project would be more than adequately covered by the transfer to the proposed project of \$53.1 million of assets from the existing system.

The Applicant gave the Board assurances that its corporate accounts would not be altered by the proposed treatment of the transfer of the "existing assets" to the new project.

In the revised pro forma financial data the rate of return on rate base was maintained at a constant 13.5 per cent. This rate was derived from calculations of cost of debt and required return on equity for the original 75/25 debt/equity ratio.

#### Tariffs

The 15-year average tariff for the Trans Mountain section of the pipeline from the international boundary to Edmonton, Alberta is  $\$3.96/\text{m}^3$  ( $\$0.63/\text{b}$ ). This figure is based on a throughput projection of  $79.5 \times 10^3 \text{ m}^3/\text{d}$  (500 Mb/d).

The Applicant stated that the estimated operations and maintenance expense did not reflect any cost savings associated with the fact that the line would use essentially the same right-of-way as the existing pipeline. It was recognized that such savings might materialize after the initial stabilization period of five years.

Financing Plan

As discussed under "Financial Parameters", the Applicant believes that the project could be financed on a 90/10 ratio of debt to equity. The Applicant's equity would consist of transferred assets and the debt financing would be raised primarily on the Canadian market.

A witness for the Applicant stated that, if its application were given conditional approval by the Board, it could make the necessary arrangements to finance the project. These arrangements would include letters of intent and throughput and/or deficiency agreements. There would be no drawing down of capital for expenditures on construction until the proposed environmental studies were complete.

The Applicant stated that the debt retirement plan was based on ten years because of the estimated peaking of the ANS crude oil supply and that the plan would likely be supported by ten-year deficiency agreements with seven refineries in the Northern Tier.

The financial adviser to the Company testified that, in his opinion, subject to obtaining the necessary completion arrangements and throughput and/or deficiency agreements, the project at inflated cost estimates was financeable within the bounds of the current capital market. The Applicant argued that the marketplace would decide the financeability of its project.

Views of the Board

The Board recognizes the current instability of interest rates.

In the view of the Board, a constant 13.5 per cent rate of return on rate base would result in an unduly high rate of return on equity in the earlier years of the project which would eventually fall to a level consistent with other companies with mature rate bases.

The concept adopted by the Applicant in its treatment of the transfer of the existing assets to the proposed project is acceptable to the Board for financing purposes only and must not be construed as restricting the Board in determining at a later date the value to be used for rate base and rate-making purposes.

The Applicant did not yet have signed throughput contracts and/or deficiency agreements. No letters of intent for the financing were produced in evidence.

On the basis of the evidence submitted, the Board finds the financing plan acceptable. However, any certificate of public convenience and necessity which might be issued would require that Trans Mountain, before commencing construction, would:

- (i) prove to the Board's satisfaction that adequate financing was in place; and



- (ii) file with the Board copies of executed through-put contracts and/or deficiency agreements.

SOCIAL AND ECONOMIC IMPACTS OF THE PROPOSED PROJECT

Regional Social and Economic Impacts

The Impact Region and Proposed Project

The proposed pipeline would pass through or near a large number of communities ranging in size from a few hundred to nearly 70 000 inhabitants such as in Kamloops, B.C. In 1976, the total labour force in these communities totalled some 46 000 engaged in forestry, mining, trade, construction, agriculture, tourism and transportation. Unemployment was stated to be at least 10 per cent.

Twenty Indian Bands have reservations near the right-of-way with a total population of approximately 3 000. The proposed pipeline would cross 12 reservations. According to the Applicant, major activities of band members include farming, ranching, logging and sawmill operations. Cross-examination by the Union of British Columbia Indian Chiefs highlighted the importance of hunting and fishing as a major source of food.

The Applicant estimated that, over a 24-month period, \$383 million would be expended to build the pipeline and pump stations requiring some 22 652 man-months (or nearly 1 900 man-years), split 85 per cent for pipeline construction and 15 per cent for pump station construction.

Employment was expected to peak between the seventh and twelfth months of construction reaching 3 200 in the eighth month. Ninety per cent of the manpower requirements could be met with the available labour force in British Columbia and Alberta, with British Columbia expected to provide 60 to 65 per cent of the manpower and Alberta the remainder. It was further stated that "about one-third of the manpower requirements could be met with the use of local labour from communities located close to the pipeline route".

The total estimated delivered costs of materials was expected to be about \$153 million of which roughly 80 per cent would be used in British Columbia. Alberta was expected to furnish 58 per cent of the materials, structures and equipment used for the construction, with steel pipe accounting for 95 per cent of that figure. British Columbia was expected to be the source of 5 per cent of the materials, structures and equipment used. Of the over \$8 million estimated for transportation costs, 85 per cent was for rail and 10 per cent for highway.

Contracted services were estimated at roughly \$85 million. Engineering costs were estimated at \$13.4 million including 4 260 man-months of employment required for engineering management functions. The cost of miscellaneous facilities, primarily voice and data control communications to be installed along the route, was estimated at close to \$1 million, of which about 60 per cent would originate in either British Columbia or Alberta.

Out of the above \$383 million of total direct expenditures for construction, the Applicant estimated that some \$71 million would accrue to the Federal Government and to the provincial governments of British Columbia and Alberta through corporate and personal income taxes, duties and excise, sales and fuel taxes. Of this total, the Applicant estimated that close to 70 per cent would accrue to the Federal Government, 24 per cent to British Columbia and 6 per cent to Alberta.

The operating phase would generate some 1 875 man-years of employment over 15 years (or 125 man-years each year) for a total payroll of \$61 million (or \$4 million a year over 15 years). Under cross-examination, the yearly employment figure was revised to 113 man-years. Eighty per cent of the operating employees are expected to be residents of British Columbia.

In addition to payroll costs, the Applicant estimated that fuel and power and "other operating costs" (including communication systems, repairs and maintenance, aerial patrol of the pipeline, insurance and rentals and administration costs) would total \$385 million over the 15-year period with the major portion of the above spent in British Columbia.

Also included in the Applicant's estimate of the direct economic impact are the transportation revenues generated by the project for Trans Mountain as well as for downstream systems.

The Applicant estimated the direct economic impacts resulting from the 17-year construction and operating time period at \$2 171 million and total direct employment at 3 765 man-years over the same period.

Indirect economic impacts of the proposed project were estimated at slightly more than \$1 000 million for a total direct and indirect economic impact of some \$3 257 million. The 3 765 man-years of direct employment were expected to generate an additional 8 170 man-years of indirect employment for a total of 12 000 man-years.

Furthermore, the Applicant estimated that government revenues derived from the direct construction and operating expenditures would total \$651 million: 56 per cent to the Federal Government and 44 per cent to provincial and



municipal governments. Of the latter, 80 per cent and 20 per cent would benefit British Columbia and Alberta, respectively.

Impact on Local Employment and Regional Business

The Applicant stated that the project could have a significant effect on local employment in the impact corridor, particularly in the construction and transportation industries where it was most needed.

The Applicant indicated it had a policy of requiring contractors to favour the hiring of local labour as much as practicable. As for the operating phase, the Applicant stated that it had a "long-standing policy of hiring local people because it worked out best all round".

With respect to making use of local business services, the Applicant pointed out that the proposed project should provide local businessmen with a number of opportunities such as retail and wholesale sales and service, local manufacturing, trucking and construction. In relation to the local construction industry, the Applicant identified a number of opportunities for local businesses such as in steel erection for pump stations, bulldozing and clearing etc., and concluded that such opportunities could develop if price, quality and time availability met the requirements of the prime contractor.

The Applicant stated that, during the operations phase, it would attempt to encourage the use of local business and, to this end, would keep track of the availability of local contractors and equipment.

Trans Mountain also recognized that the use of local business services and facilities could create some problems in the impact area such as local shortages of materials and products, over-expansion of businesses, and inflation of local prices. The Applicant suggested it could minimize the problems of over-expansion and shortages by making local firms aware of the opportunities which the pipeline could provide, and by encouraging contractors to restrain purchases of goods in short supply in the small towns.

Impact on Primary, Secondary and Tertiary Economic Activities, Community Services and Facilities

The Applicant recognized that agriculture would be affected to some extent by the construction phase. However, by the contractor exercising care, this impact could be minimized.

The project was expected to make use of some of the products of the forest industry. However, there is also the possibility of the project diverting labour from this industry. The Applicant also raised the possibility that the mining industry could be subjected to small price increases,

and possible shortages resulting from the diversion of materials and labour to the pipeline project. This impact was not expected to be severe.

In respect of the trade and service industry, the sector was expected to benefit from increased sales stimulated by pipeline construction. However, as was seen earlier, the Applicant also anticipated that certain disadvantages "such as labour shortages, business overexpansion, product shortages and price/cost inflation" were to be expected.

The Applicant expected transportation services and facilities to be extensively used. This should result in the project making significant revenue contributions to transportation companies during the construction period. The Applicant appeared to rely heavily on rail and trucking and, to a lesser extent, on air and bus service.

With respect to the tourist industry, the Applicant indicated that it would be affected both positively and negatively by the pipeline construction, i.e. pipeline-related personnel making use of local accommodation facilities could prolong the seasonal use of facilities but could result in displacement of tourist traffic. Nonetheless, the Applicant anticipated "that revenues earned from pipeline construction should

more than equal any losses in tourist revenue which could be experienced".

The Applicant identified a relatively close balance between the supply and demand for housing in communities, particularly the smaller ones, along the route and acknowledged that any additional demand caused by pipeline construction would likely result in some temporary housing shortage with resulting inflationary pressures. However, the Applicant suggested "that the short construction period, use of construction camps and limited need for any company housing would minimize demand for housing". Should the problem arise, the Applicant pointed out it would take appropriate steps to remedy the situation.

The Applicant indicated that, in the case of health services, some impact would likely be experienced during the pipeline construction period. However, in the Applicant's view, "most of the hospitals along the pipeline route have sufficient capacity to accommodate any additional demand from the pipeline construction". Moreover, while the Applicant acknowledged that both educational and police protection services could be affected by pipeline construction, it pointed out that the use of construction camps should serve to minimize any impact on these services.



Impact on the Indian Population

The Applicant stated that construction could temporarily alter the Indian population's lifestyle by interfering with income-earning activities (including subsistence or domestic economic activities as pointed out by the Union of British Columbia Indian Chiefs under cross-examination) and by affecting such things as the cost of living along the route of the proposed pipeline.

On the other hand, the Applicant felt that the native Indian population could experience economic benefits as a result of the construction of the proposed pipeline through the generation of business and employment opportunities. These latter opportunities were viewed as significant especially in the context of high unemployment levels among Indian Band members in the impact corridor. It was indicated that Trans Mountain and the contractors would "co-operate with the affected Indian Bands to minimize the negative impacts and, as well, to indicate the economic opportunities which would be available to native people and native businesses". Under cross-examination by the Board, the Applicant expanded on this policy statement by specifically stating that this matter would not be left purely in the hands of the contractors. Rather, the Applicant saw this as an item on which it would "take a

very strong position in supervising personally". Such initiatives, according to the Applicant, could consist of matching available and suitable manpower to employment opportunities, assisting in dealings with the unions and through direct employment wherever possible.

#### Views of the Board

Trans Mountain has provided the Board with regional social and economic impact assessment information which includes a description of the areas traversed by the proposed pipeline, an assessment of the likely impacts of project expenditures and requirements and, finally, policies and measures to enhance beneficial aspects and/or mitigate adverse impacts attributable to the construction and operation of the proposed facilities.

The Board notes that along most of its length, the proposed pipeline route falls within an existing pipeline right-of-way. The proposed route generally follows well-travelled provincial highways. The Board also notes that more than half of the population in the area to be traversed by the pipeline is concentrated in one city (Kamloops) with the remainder spread along the route in small communities.

The Board accepts the Applicant's assessment that the proposed project would generate significant direct employment opportunities for residents of British Columbia and Alberta in general, more particularly for residents situated close to the proposed right-of-way. The Applicant's attitude towards local employment should promote the use of local labour. The Board notes, however, that more than half of these opportunities would be of a short-term nature limited to the two-year construction period.

The proposed project should give rise to a number of business opportunities which could be obtained by local firms. With respect to the construction phase, since such opportunities would materialize only if the price, quality and time availability of local firms met the requirements of the prime contractors, it is not possible to predict the extent or level of local participation. During the operations phase, however, the Board agrees that local participation in project-generated business opportunities would occur, given the Applicant's undertaking to actively encourage the use of local business.

The Board notes the special efforts which the Applicant would make to provide project-related employment

and business opportunities to the Indian population residing along the proposed right-of-way.

The Board expects, however, that some of the above potential local benefits could be offset by diversion of labour from other local employment to the proposed project, by supply shortages of goods and services (particularly in the smaller communities) and by some inflation of local prices as a result of the project. However, these pressures could be minimized by the use of construction camps as well as other mitigative measures proposed by the Applicant.

With respect to the Applicant's requirements for community services and facilities such as hospital, educational and police protection services, the Board does not believe the Applicant's project would overburden such existing services. The Board accepts the Applicant's opinion that, during the construction phase, the use of construction camps, the short construction period and the limited need for any company housing would minimize excessive demand for community services and facilities. As to the operations phase, the Board takes notice of the close balance between housing demand and supply in communities situated along the right-of-way and expects, in light of the Applicant's record, that appropriate steps



would be taken, if necessary, to alleviate undue pressures on the local housing market.

The Board notes that, of the \$383 million to be spent on the construction of the project and some \$500 million to be spent on operations and maintenance (over a 15-year period), a large portion would be spent in the provinces of British Columbia and Alberta. These expenditures would be significant for the economies of these provinces. The Applicant has suggested that the direct and indirect effects of the project could reach 12 000 man-years and \$3.2 billion. While the Board acknowledges sizeable effects, it views these estimates of indirect impact as very optimistic since the short-term expenditures and employment opportunities related to the construction phase are unlikely to have as lasting or as important an effect on British Columbia and Alberta as on-going operating expenditures would.

In conclusion, the Board is confident that the proposed pipeline could be built without raising any significant socio-economic problems and believes the project would bring economic benefits to the areas which the pipeline would traverse.

Should a certificate be granted to Trans Mountain, the Board would require Trans Mountain to file,

following completion of construction, a brief report outlining the regional social and economic impact related to the construction of the proposed facilities. Such report would detail the levels of local employment related to the project, the extent of local business involvement and any other significant impact of an economic or social character.

#### COST BENEFIT ANALYSIS

The fundamental objective of cost benefit analysis is to estimate the (direct) net economic benefits to the Canadian economy from building and operating the proposed project. To do this the cost and benefit elements of the project are identified and then evaluated. The analysis is carried out in terms of costs and benefits to society as a whole rather than private costs and benefits. Notably, payments such as taxes and duties are considered as transfers and, therefore, are not included as costs of the project to society.

Evidence

The analysis by Trans Mountain indicated there would be direct economic benefits from a number of sources:

- (i) cost of service revenues for the proposed line between the international boundary and Edmonton;
- (ii) reduction in average tariff for users of the existing Trans Mountain pipeline from Edmonton to Vancouver;
- (iii) cost of service revenues from moving "project" crude oil downstream from Edmonton;
- (iv) reduction in average tariff for other crude oil in the system downstream from Edmonton; and
- (v) dividend income from foreign investment by Trans Mountain in its U.S. subsidiary.

Cost of service revenues were estimated on the basis of a constant average daily throughput of  $79.5 \times 10^3 \text{ m}^3$  (500 Mb). The average real tariff over the 15-year operating life was estimated at  $\$3.96/\text{m}^3$  (\$0.63/b) with annual variation as indicated in Table 3.

Table 3TRANS MOUNTAIN PROPOSED TARIFFS(\$1979/m<sup>3</sup>)

<u>Operating Year</u>	<u>Tariff</u>	<u>Operating Year</u>	<u>Tariff</u>
1	4.95	9	3.95
2	4.82	10	3.82
3	4.70	11	3.69
4	4.57	12	3.40
5	4.45	13	3.10
6	4.32	14	2.80
7	4.20	15	2.50
8	4.07		

Existing users of the Trans Mountain pipeline between Edmonton and Vancouver would enjoy a tariff reduction because of the transfer of certain surplus assets to the proposed pipeline. This tariff reduction was estimated at 17 per cent, some \$4.1 million, in the first full operating year. It dropped to 11.3 per cent, some \$1.7 million, in the fifteenth operating year.

Additional revenues would also be derived from the movement of "project" crude oil through pipelines downstream from Edmonton. The amount of such revenues was based on a tariff sufficient to pay for the incremental capital and operating costs associated with the proposed throughput. Averaged over the project's 15-year economic life the annual incremental tariff was determined to be \$1.71/m<sup>3</sup> (\$0.27/Bbl), some \$49.5 million.



Because of the better use of presently underutilized facilities, the existing users of the downstream pipelines would enjoy a tariff reduction of some 20 per cent, or \$43.5 million per annum, over the economic life of the project from the additional throughput of  $79.5 \times 10^3 \text{ m}^3/\text{d}$  (500 Mb/d).

Trans Mountain also considered the amount of dividends that it would receive from its wholly owned U.S. subsidiary to be a benefit. These dividends were projected to range from \$4.6 to \$12.4 million per year over the life of the project.

The analysis by Trans Mountain considered the following direct costs to the Canadian economy from its proposed project:

- (i) capital costs of constructing the proposed pipeline;
- (ii) pipeline operating and maintenance costs;
- (iii) incremental construction costs for the downstream pipeline system;
- (iv) incremental operating and maintenance costs for the downstream pipeline system; and
- (v) equity investment in its U.S. subsidiary and dividend payments to foreign residents from its Canadian operations.

Construction costs for the proposed project pipeline were estimated as indicated in Table 4.

Table 4

TRANS MOUNTAIN'S ESTIMATE OF CAPITAL COSTS

(\$ million 1979)

	<u>First Construction Year</u>	<u>Second Construction Year</u>	<u>Total</u>
Cash expenditures	114.8	268.0	382.8
Transferred assets	16.0	37.2	53.2
Interest during construction	<u>8.5</u>	<u>34.1</u>	<u>42.6</u>
TOTAL	<u>139.3</u>	<u>339.3</u>	478.6

The total costs for the two construction years, when adjusted by Trans Mountain for taxes and duties to reflect only the real costs borne by society, amount to a total of \$359.7 million, of which \$107.9 million would be expended during the first year of construction and \$251.8 million during the second.

Annual operating and maintenance costs are shown in Table 5.

Table 5

TRANS MOUNTAIN'S ESTIMATE OF  
ANNUAL OPERATING AND MAINTENANCE COSTS

(\$ million 1979)

<u>Items</u>	<u>Cost</u>
Operating	19.6
Maintenance	3.7
Overhead	3.6
Ad Valorem Taxes	<u>8.0</u>
TOTAL	<u>34.9</u>

Trans Mountain's adjustments to the above for taxes and duties resulted in an estimate of annual operating and maintenance costs of \$24.6 million, for social cost benefit purposes.

Capital expenditures for the Canadian operations of the downstream pipeline companies were projected as indicated in Table 6.

Table 6

TRANS MOUNTAIN'S ESTIMATE OF  
INCREMENTAL DOWNSTREAM CAPITAL EXPENDITURES

(\$ million 1979)

<u>Operator</u>	<u>Cost</u>
Rangeland	64.2
Interprovincial	25.8
Wascana <sup>(1)</sup>	<u>0.5</u>
TOTAL	<u>90.5</u>

- 
1. This is based on written evidence. However, during cross-examination, Trans Mountain's witness stated that the Applicant was not relying on the Wascana system for the movement of crude oil.

The Applicant's adjustments to the above resulted in an estimate of \$82.3 million for social cost benefit purposes. The costs in the first year were estimated to be \$24.7 million and in the second year, \$57.6 million.

Incremental operating costs were based on discussions with downstream pipeline companies. It was estimated that annual downstream operating costs would range from \$33 million to \$35 million. The average annual operating cost for social cost benefit purposes was estimated to be \$22.5 million.

The U.S. portion of the project was estimated to require capital investment of \$235.3 million of which 10 per cent, some \$23.5 million, would take the form of direct equity investment by the Applicant. This equity investment would occur in a 30/70 ratio over the planned two-year construction period.

There would be an outflow of capital in the form of dividends to foreign shareholders resulting from Trans Mountain's operations. It was estimated that these annual dividends, net of withholding tax, would reach a maximum of \$2.9 million.



The analysis was based on a project life of 15 years and assumed that the economic resources of labour and capital were fully employed in the Canadian economy.

In its application, Trans Mountain referred to a number of "broader positive aspects" which were perceived as benefits. Although these benefits could not be quantified, factors considered to have an overall bearing upon the project were that:

- (i) By 1995, as much as 85 per cent of Canadian crude oil requirements would be supplied by imports. It would, therefore, be prudent for Canada to strengthen its access to external suppliers of crude oil and provide an additional point of entry for offshore crude oil on the west coast.
- (ii) Trans Mountain's proposed pipeline "would greatly reduce the supply shortage to (the) U.S. market area...and so help to alleviate severe pressure on Canada to postpone further curtailments of (crude) oil exports even in our own national interest".

- (iii) The inflow of foreign debt capital for its project would create major "revenue-producing facilities within Canadian control in the space of 2 years.
- (iv) The "strategic value of a cooperative low cost (crude) oil pipeline link to both the Canadian and U.S. total supply scene should be clear".
- (v) The low cost of the new system through Edmonton compared very favourably with the proposed U.S. alternative.

To conclude, Trans Mountain calculated the net economic benefits of the project, expressed in 1979 dollars discounted to 1980, as summarized in Table 7.

Table 7

SUMMARY OF  
TRANS MOUNTAIN'S COST BENEFIT ANALYSIS

(\$ million 1979)

Discounted to 1980 at	<u>9%</u>	<u>12%</u>	<u>15%</u>
<u>Gross Benefits</u>			
Trans Mountain	928.6	776.6	656.5
Downstream Pipelines	687.7	565.5	472.9
Foreign Investment	63.2	50.7	41.5
Total	<u>1 679.5</u>	<u>1 392.8</u>	<u>1 170.9</u>
<u>Gross Costs</u>			
Trans Mountain	520.8	482.3	452.0
Downstream Pipelines	243.9	212.9	189.2
Foreign Investment	28.9	27.0	25.7
Total	<u>793.6</u>	<u>722.2</u>	<u>666.9</u>
<u>Net Economic Benefits</u>			
Trans Mountain	407.8	294.3	204.5
Downstream Pipelines	443.8	352.6	283.7
Foreign Investment	34.3	23.7	15.8
Total	<u>885.9</u>	<u>670.6</u>	<u>504.0</u>

According to Trans Mountain's estimates, the net economic benefits range from some \$500 million at a 15 per cent discount rate to some \$890 million at 9 per cent.

In addition to Trans Mountain's cost benefit submission, PanCanadian, an intervenor, submitted evidence analyzing the costs and benefits of heavy crude exports from Canada to the U.S. and determined the net benefits which would be lost if this export market were disrupted. The analysis was carried out by comparing two cases:

- (i) all production surplus to Canadian requirements would continue to have an assured market, either

in the U.S. or later as an upgraded feedstock in western Canada; and

- (ii) all production surplus of heavy crude oils would be shut-in from 1982 to 1985 inclusive.

#### Views of the Board

PanCanadian's cost benefit analysis assumed that heavy crude oil exports would be shut-in for a period of four years should Trans Mountain be certificated. However, the Board's view, based upon the evidence, is that it would be unlikely that crude oil deliveries through the proposed Trans Mountain pipeline would in fact reduce Canadian heavy crude oil exports. The maintenance of this market was acknowledged to be mainly dependent on price. Under present heavy crude oil export policies, which encourage the development and production of Canadian heavy crude oil, it is unlikely that Canadian producers would suffer shut-in surplus capacity. Accordingly, the Board's estimate of net economic benefits does not take into account possible economic losses such as were suggested by PanCanadian.

For purposes of cost benefit analysis, the Board accepted several of Trans Mountain's assumptions, namely: the economic life of the project, the estimates of capital and operating costs, and the foreign ownership assumptions. However, additional assumptions were made as follows:



a residual value of some \$3.6 million was assumed for the Trans Mountain pipeline facilities and some \$10 million for port facilities to be owned by Trans Mountain's U.S. subsidiary.

Concerning revenue estimates, the Board has made two revisions; first, revenues derived by Trans Mountain were based on an estimated cost of service. Three items of the cost of service namely depreciation, interest and earnings were stated in nominal dollars but were not subsequently deflated by the assumed rate of inflation. A revision by the Board, to reduce nominal dollars to "real" dollars, had the effect of lowering the amount of revenues estimated by Trans Mountain. Second, it is the view of the Board that downstream transmission revenues should be calculated in a manner similar to project pipeline revenues. The methodology used by Trans Mountain, using an average value for revenues over future years, resulted in an understatement of benefits in the early years of the project and an overstatement in later years. The Board recalculated downstream revenues to take into account their decline because of a reducing rate base.

While accepting Trans Mountain's general approach to estimating benefits to existing users of Trans Mountain

and to existing users of downstream pipeline systems, the Board notes that, because of uncertainties set out below, the estimated benefits to existing downstream pipeline users may be viewed as a maximum.

- (i) If future Canadian or foreign crude oil volumes decrease, benefits to Canadians would be reduced. However, if future Canadian crude oil supplies increase, certain options for transporting Canadian crude oil may be closed because existing spare capacity in the downstream system would be utilized by the proposed project.
- (ii) The ownership of the downstream pipelines and possible leakage of benefits through dividend payments made outside of Canada have not been considered.
- (iii) Tariff reductions are based on a proportion of the increased crude oil volumes being transported through spare capacity in the existing system without additional capital expenditure.

A number of other assumptions were also incorporated by the Board. The Trans Mountain equity investment in the pipeline from Low Point to the

international boundary was viewed as a cost with subsequent dividend payments included as benefits. Finally, the Board assumed a foreign exchange rate of \$1 Canadian = \$0.85 U.S. during the construction phase, rising to \$1 Canadian = \$0.90 U.S. during the operations phase.

In the Board's assessment, with the exclusion of possible environmental costs and other difficult-to-quantify factors, the evidence indicates that the project will provide positive net economic benefits to Canada of about \$500 million (present value in 1979 dollars at a ten per cent discount rate; refer to Table 8). While the Board's estimate of net economic benefits is somewhat less than that of Trans Mountain and should be viewed in the context of the uncertainties surrounding some 70 per cent of the estimated net economic benefits which were attributed to downstream pipeline users, the Board is satisfied that the proposed pipeline would provide significant economic benefits to Canada.

Table 8

SUMMARY OF THE BOARD'S COST BENEFIT ANALYSIS  
OF THE TRANS MOUNTAIN PIPELINE PROJECT

(\$ million 1979)

Discount Rate	<u>5%</u>	<u>10%</u>	<u>15%</u>
<u>Gross Benefits</u>			
Trans Mountain	853.1	599.6	440.7
Downstream Pipelines	835.9	565.9	402.8
Foreign Investment	48.1	31.4	21.6
Total	<u>1 737.1</u>	<u>1 196.9</u>	<u>865.1</u>
 <u>Gross Costs</u>			
Trans Mountain	562.8	460.8	393.0
Downstream Pipelines	287.6	211.5	164.5
Foreign Investment	26.7	23.4	21.1
Total	<u>877.1</u>	<u>695.7</u>	<u>578.6</u>
 <u>Net Economic Benefits</u>			
Trans Mountain	290.3	138.8	47.7
Downstream Pipelines	548.3	354.4	238.3
Foreign Investment	21.4	8.0	0.5
Total	<u>860.0</u>	<u>501.2</u>	<u>286.5</u>

CANADIAN CONTENT

Evidence

Trans Mountain estimated the Canadian content of the Canadian portion of the project to be 89 per cent, based on its survey of Canadian manufacturers, suppliers, and a construction cost estimate.

Respondents to the Applicant's survey were requested to provide:

- (i) the Canadian content of the material and service components of their products;



- (ii) a description of how the Canadian content percentages were calculated;
- (iii) for non-Canadian content, the reasons why components could not be obtained domestically; and
- (iv) the percentage of their companies beneficially owned by Canadians.

Results of the survey showed that:

- (i) two domestic producers had been considered for the supply of line pipe;
- (ii) depending on the product or cost category and the suppliers ultimately chosen, there could be significant variation in the Canadian content of the "materials" component of the estimate, particularly for prime movers (diesel engines), valves, equipment for communication and control and pipeline coatings; and
- (iii) the "services" component was generally estimated to be higher, often approaching 100 per cent.

The Applicant further stated that:

- (i) it had used the average Canadian content of the suppliers surveyed in each cost category to determine the overall Canadian content figure;

- (ii) in general, the non-Canadian content stemmed from the lack of manufacturing facilities, the unavailability of raw materials in Canada and the import content of construction equipment; and
- (iii) it intended to give preference to Canadian sources but that a final purchasing policy had not been finalized.

#### Views of the Board

The Board accepts that the level of Canadian content estimated by the Applicant is within the capabilities of Canadian industry. However, the Applicant's own data illustrate that for certain products there could be significant variation in the level of Canadian content achieved. In addition, depending on the availability and deliverability of some components, the Board notes that the 89 per cent Canadian content figure could be lower.

The Board is of the view that the Applicant, through its purchasing policies, should ensure that the potential benefits from its project are realized. Should a certificate be granted, the Board would require the Applicant to file a report with the Board, within 12 months after leave to open has been granted, indicating:

- (i) for each cost category in Exhibit No. 18, Table II-8-1 (Revised) and the Construction Cost Estimate in Exhibit No. 23, Tab 2, the percentage Canadian content achieved, any variations from the estimates in the application and the reasons for these variations; and
- (ii) in respect to the cost categories of Pipe, Pumps, Diesel Engines, Electric Motors, Valves, Fittings, Coatings in Table II-8-1 (Revised) and the Construction Cost Estimate in Exhibit No. 23, Tab 2, a statement setting forth which Canadian firms were asked to make contractual bids and the names of the firms to which contracts were awarded.

ENVIRONMENTAL ASPECTS

The Applicant submitted an environmental impact statement for the 927 km (576 miles) of new pipeline, a separate environmental impact assessment for the five new pump stations and topographic maps illustrating facilities and resources, with a bar chart of the pipeline corridor showing site-specific comments and recommendations.

The environmental impact statement for the new pipeline contained a description of the existing environment to be traversed by the project, an assessment of the probable environmental impacts from the project and a description of procedures and methods to be implemented to protect the environment during construction and operation of the facility. Included in this statement were the environmental consultant's recommendations for additional site-specific assessment work to protect sensitive wildlife and fish resources.

With respect to each of the new pump stations, the Applicant provided a description of the existing physical and biotic environment at the proposed pump station sites, an assessment of the impact of the facility on the biophysical environment and a description of the mitigating measures proposed to reduce the impact of the stations on the environment. This included an environmental impact statement concerning the potential extent of noise impact on human activity and wildlife, as a consequence of pipeline construction and operation.



The Applicant's witness testified that it was the intention of Trans Mountain, in the event that the line were certificated, to carry out the recommendations contained in the environmental impact assessment, no recommendation in the report being beyond the Applicant's normal policy or good practice in installing a pipeline facility.

#### Terrain and Land Use

The environmental impact assessment of the proposed pipeline contained a narrative description of the bedrock and surficial geology along the proposed route. This was based on information derived from a literature review, personal communications with resource scientists, specialists, government agents and Trans Mountain's personnel in charge of operations on the existing pipeline, together with a reconnaissance survey of the existing right-of-way.

Potential geological hazards such as seismic activity, rockfalls, debris flows, snowslides (avalanches), erosion, scour at river and stream crossings, bank slumping and resulting oil spills were assessed along the pipeline route. The environmental consultant provided listings of mitigative and protective measures to be implemented to protect the new pipeline from rockfalls, debris flows, snowslides, surface erosion, bank slumping, natural springs and swamps. The new facilities would be located within seismic zones 0 (negligible seismic hazard) to 2 (medium seismic hazard).

Trans Mountain's environmental officer testified that for any oil spill, whether it were to occur as the result of an earthquake or some other accident, the primary concern of the Company would be to contain and clean it up.

The Applicant anticipated that the station locations would cause no significant impacts on the biophysical environment. Some detailed studies would be required to verify this conclusion and to prepare specific mitigative measures where required.

On the environmental assessment maps, submitted as part of Trans Mountain's application, provincial and national parks, park reserves, conservation areas, campsites, picnic areas and highway rest areas were noted. Areas with a high recreation potential and use were described and reviewed further in the text of the environmental impact statement.

The major impact upon recreation areas from pipeline construction would be aesthetic. The working area would be cleared, the ground disturbed, and the appearance of the area would suffer. Noise generated by construction equipment, temporary delays and traffic congestion resulting from construction activity adjacent to a highway, and competition for facilities such as restaurants and motel accommodation, would be intrusive to many tourists.

Trans Mountain proposed to minimize the impact of pipeline construction upon recreation areas by scheduling pipeline construction through those areas to avoid their peak use season. Right-of-way clean-up would be completed immediately after construction. In sensitive locations, construction contracts would specify the use of quieter equipment and construction would be restricted to minimize inconvenience to tourists. Consultations would be held with the responsible parks and recreation authorities to reduce the conflict with recreational use by the general public.

Trans Mountain submitted a description of agricultural land along the pipeline right-of-way showing those areas where drainage systems are present.

To prevent serious impacts on agricultural productivity, Trans Mountain would strip the plow layer or upper 20 to 30 cm (8 to 12 inches) of the soil prior to trenching and would stockpile this material separately. Trans Mountain's witness testified that the topsoil would be stripped over the trench line, the working side of the right-of-way and the subsoil storage area. After backfilling, the topsoil would be distributed over the area from which it had been stripped. The witness also stated that any excess subsoil which arose from the excavation would be removed from the area. Soil compaction by heavy

construction equipment would be avoided and mitigative measures would be taken to restore soil to its former tilth.

Across agricultural land underlain with drainage systems, Trans Mountain would locate and flag all cut subsurface drains. The cut ends of each drain would be carefully cleaned and plugged with burlap. After right-of-way traffic from construction had ceased, permanent repairs and replacement of damaged drains, using perforated, corrugated galvanized asphalt coated steel pipe, would be made and completed to the satisfaction of landowners.

Trans Mountain's witness testified that usually individual landowners would be consulted so as to minimize the inconvenience to his operations.

Trans Mountain's environmental consultant identified two International Biological Program (IBP) sites, Finn Creek Cedars (km post 613) (mp 381) and Tête Jaune Dunes (km post 484) (mp 300) which are situated adjacent to the pipeline right-of-way. Trans Mountain submitted the opinion of the Ecological Reserves Unit that impact on these sites would be minimal.

An experimental forest had been established by the Alberta Department of Forestry at Nojack (km post 155) (mp 960) to study growth responses of lodgepole pine to various forestry management régimes. For 3.2 km (2 miles), the existing and proposed pipelines would traverse this 518-hectare (1 280-acre) research area.



Trans Mountain acknowledged the concern of the Alberta Forest Service with regard to the impact of additional right-of-way clearing on the experiments presently being conducted in the research area. Trans Mountain's witness testified that he would ascertain whether additional right-of-way clearing would be necessary through the Nojack Experimental Forest. In addition, the witness testified that he would recommend that Trans Mountain fence the edge of the right-of-way through the Nojack Experimental Forest to prevent any movement of vehicles off the right-of-way.

The location of known archaeological sites and the relative archaeological potential of major sections of the route were identified in the environmental impact statement. It was the opinion of the environmental consultant that, since the proposed pipeline would be within the existing right-of-way for most of its length and would be adjacent to other facilities in many places, impact on archaeological sites would be minimal.

The consultant recommended that a detailed archaeological survey be undertaken along the pipeline route to locate and record new sites. As new sites were discovered, these would be flagged so that construction activity could be diverted around them. It was recommended that, should it not

be possible to preserve these sites, archaeological salvage would be undertaken prior to the commencement of construction.

#### Fisheries and Wildlife

The proposed Trans Mountain pipeline right-of-way would cross three major river drainages: the Fraser River which drains into the Pacific Ocean, the Athabasca River flowing into Lake Athabasca and ultimately the Arctic Ocean, and the North Saskatchewan River which flows east into Hudson Bay.

The environmental consultant described the physical characteristics of the watercourses which would be crossed by the pipeline, and the migration, spawning, incubation and emergence times for spring and fall spawning fish species indigenous to those watercourses.

The major potential impacts on fish associated with pipeline construction were identified as:

- (i) obstruction or disruption of fish spawning migrations,
- (ii) loss of fish spawning, rearing or overwintering habitats,
- (iii) mortality of incubating fish eggs and emerging fry,
- (iv) injury or death of resident juvenile and adult fish, and
- (v) loss of food sources for fish.

The environmental consultant stated that these potential impacts on fish resources could be minimized or eliminated by carefully planned schedules, designs and construction techniques in order to avoid crossing the watercourses during sensitive time periods in fish lifecycles.

The environmental impact statement described the five biotic areas traversed by the proposed pipeline right-of-way in British Columbia and Alberta. The biotic areas were the Puget Sound Lowlands, the Coast Forest, the Dry Forest, the Sub-Alpine Forest and the Canadian Life Zone. Each of these areas was unique and contained a wide variety of wildlife. The abundance, distribution and species diversity of wildlife in any one area was limited by both the quantity and quality of available habitat.

Trans Mountain's environmental consultant stated that pipeline construction activities would result in habitat disruption and disturbance of wildlife along the pipeline route. When mature and secondary vegetation was removed and where potholes and marsh would be traversed, avifauna nesting, feeding and protection areas would be lost. Browse and cover species critical to the winter survival of ungulates would be removed from the right-of-way. Where construction across

lowland areas disrupts water flows or ponding, habitats for beaver and muskrat would be affected. Pipeline and pump station construction would be both labour and machinery intensive, causing the greatest overall noise stimulus and, therefore, the greatest degree of disturbance to wildlife found along the pipeline route.

Mitigation of the impact on wildlife caused by habitat disruption and wildlife harassment would best be achieved by careful scheduling of pipeline construction activities in sensitive wildlife habitat areas. Trans Mountain's environmental consultant described, by geographic area, the recommended pipeline construction schedule to mitigate the impact on wildlife.

The environmental consultant also identified several areas where further studies should be conducted to assess the extent to which wildlife utilize certain areas and the potential impact of the proposed pipeline. If necessary, plans to avoid conflict between wildlife usage and pipeline construction activities would be developed.

#### Vegetation

Trans Mountain's environmental impact statement described in general terms the natural vegetation along the proposed pipeline route. Vegetation removal would have an adverse effect on soil and hydrological characteristics and phenomena as well as on the landscape.



Trans Mountain's environmental consultant recommended rapid re-establishment of a vegetation cover to prevent soil erosion, to minimize the impact on the hydrologic régime and enhance aesthetic appeal. This would also mitigate the loss of wildlife habitat. Revegetation would be required on all forested crown lands in British Columbia with the exception of riparian habitats, wet meadows and swamps which would be left to regenerate naturally. In Mount Robson Park, revegetation by natural invasion of species would be preferred by Park authorities but if that did not occur over a period of two years, then special plantings would be necessary. Revegetation with native species is also required by Park authorities for Jasper National Park.

#### Handling of Construction and Operating Materials

In the environmental impact statement, it was reported that supplies for construction would include diesel oil, gasoline, grease, hydraulic fluid and blasting material. Reference was also made to supplies of insecticides, herbicides, pipe coating materials, anti-corrosion materials and flushing or purging agents.

The environmental consultant stated such materials and other toxic wastes would be stored in secure containers in designated industrial areas off the right-of-way, according to rules and regulations established by the appropriate municipal, provincial and federal agencies. Materials would be transported onto the working area in special vehicles and transfers to construction equipment would be made only where it was unlikely that a non-detected spill could seep into a watercourse.

Trans Mountain submitted its oil spill contingency manual in evidence. The manual consists of a description of the emergency organization and the response procedures currently in place to handle an oil spill. Trans Mountain provided a detailed discussion of the procedures for spills on land and water. This included shutting off the source of the oil, containment of the spill, recovery and disposal of the free oil and restoration of the damaged area.

Trans Mountain observed that over the 25-year period from 18 October 1953 to 30 August 1979, a total of  $7.724 \times 10^3 \text{ m}^3$  (48.58 Mb) of oil had been lost. The largest single incident occurred in 1954 at Wabamum Lake, Alberta where  $3.2 \times 10^3 \text{ m}^3$  (20.165 Mb) of oil was released affecting a 4-hectare (10-acre) area. Trans Mountain stated that in two instances restoration treatment of spill areas

had improved crop yields, and in all other instances, residual impact had been insignificant and the environment had returned to normal stable conditions.

In response to questioning, Trans Mountain's witness provided the steps which Trans Mountain personnel would follow if a pipeline break were to occur including: the closing of block valves, shutting down of the pump stations, the mobilization of equipment and personnel and the procedures to limit the extent of the crude oil spill.

During the operational phase, the noise emissions from the diesel and electric powered pump stations would have an adverse effect on the area surrounding the station.

Trans Mountain stated that the new pump station facilities would be designed to minimize noise levels by:

- (i) measuring and analyzing the noise emissions from existing diesel and electric pump stations,
- (ii) evaluating and selecting acoustical criteria for each location,
- (iii) specifying noise levels for new equipment, and
- (iv) examining and evaluating necessary mitigation methods to meet the selected acoustical criteria.

Trans Mountain's environmental consultant further recommended that the Company monitor actual operation of each pump station to ensure that the design specifications would be met.

#### Environmental Mitigative Measures

Trans Mountain's environmental consultant recommended that construction crews be made aware of the potential impact their activities could have on wildlife and wildlife habitat.

Trans Mountain's witness testified that the Company would instruct the contractor with regard to the behaviour of the contractor's personnel. Procedures and operations to protect the environment would be incorporated into the construction contracts.

Trans Mountain's environmental consultant observed that protection of the environment during construction would be accomplished with well-planned procedures and operations. To further develop this statement the consultant described basic objectives to be included in the specifications.

The environmental consultant further observed that Trans Mountain would have at least one environmental officer for each spread and in many instances would have two or more. The environmental inspector would monitor all activities along the pipeline spread that would affect the environment



and enforce the conditions of the certificate and insist on the adherence to the procedures and plans submitted by the Applicant's engineers and included in the terms of the construction contracts. He would also be expected to provide suggestions for modifications to existing construction activities which would further minimize the environmental impact. This field inspection should be continued beyond the end of construction into start-up and commissioning to ensure proper operation of facilities.

For the period after start-up of the system, the environmental consultant recommended that a program be undertaken to assess the effectiveness of erosion control and revegetation procedures, and to monitor noise emission levels and waste disposal. One year after start-up of the pipeline, a post-construction report would be submitted showing the condition of the environment along the right-of-way and indicating any further restoration required.

#### Residual Impacts

Trans Mountain's environmental consultant summarized the potential impacts on the physical biotic resources which could remain indefinitely after all prevention and mitigation measures and procedures had been applied.

These included:

- (i) the removal of vegetation during widening of the right-of-way to allow for regular inspection and maintenance operations,
- (ii) the potential for long-term erosion of streambanks,
- (iii) the potential for accidental crude oil loss during operation of the facility,
- (iv) the increase in perceived noise levels in areas surrounding pump stations, and
- (v) the loss of wildlife habitat due to right-of-way clearing.

The environmental consultant felt that, while there would be residual impact resulting from construction and operation of this pipeline, the extent and severity of the residual impacts would not be significant.

#### Views of the Board

The Board has carefully considered the environmental evidence of the Applicant and is of the opinion that the proposed facilities could be constructed and operated in a manner which would satisfy environmental concerns, given the implementation of effective mitigative measures. The Board notes Trans Mountain's undertaking to carry out the recommendations contained in the environmental impact assessment and in the map appendix to the assessment statement. The

Board accepts Trans Mountain's undertakings and, as a condition of a certificate, would require the Applicant to incorporate the recommendations into its construction specifications contract with its contractors. Should a certificate be granted, the Board would require the Applicant, after completion of construction, to submit a report describing the impact of construction on the environment and assessing the effectiveness of the company's policies, practices and procedures in preventing or mitigating adverse environmental effects.

Concerning the impact of pipeline construction upon Public Recreation Land, the Board notes as particularly desirable the recommendation that consultations be held with park officials in order to reduce the potential for conflict between pipeline construction and recreational use of the parks by the general public.

To minimize the impact upon agricultural land, the environmental consultant recommended scheduling pipeline construction when agricultural soil would be dry, stripping and stockpiling topsoil for use during restoration, locating and flagging subsurface drainage systems, and repairing subsurface drainage systems and restoring topsoil during clean-up of the right-of-way. As a condition of any certificate which it might grant, the Board would require the Applicant:

- (a) to confirm with each involved landowner:
  - (i) the timetable for pipeline construction;
  - (ii) the soil conservation procedures;
  - (iii) the restoration procedures for topsoil and agricultural drainage systems that would be implemented by the Applicant during crossing of his property;
- (b) to submit, for approval by the Board, its plans and procedures for the disposal of excess subsoil from the pipeline trench;
- (c) to monitor crop productivity on the right-of-way for three years after construction, including comparisons of on and off right-of-way conditions; and
- (d) to provide a quantitative report to the Board on the results of this monitoring of crop productivity (item c), including any further soil restoration measures that might be warranted.

Regarding the Nojack Experimental Forest and the concern expressed by personnel of the Alberta Department of Forestry, the Board would require the Applicant to confine all construction activity to the existing right-of-way through this forest and to fence the edge of the right-of-way to prevent any off the right-of-way movement by construction vehicles.

With respect to fish and wildlife resources, the Board recognizes the importance of careful scheduling of pipeline construction in order to minimize its impact upon



fish and wildlife populations. The Board would require the Applicant:

- (i) to submit to the Board a construction schedule for each pipeline spread incorporating the environmental consultant's recommendations for timing pipeline construction activity to avoid sensitive periods of fish and wildlife lifecycles and meeting the requirements of other federal and provincial regulatory agencies; and
- (ii) to incorporate this construction schedule into the construction specifications contract with the contractors.

Concerning the transportation, storage and use of fuels, lubricants and other toxic materials, the Board notes the consultant's recommendations that hazardous products be stored in designated industrial areas off the right-of-way, that transportation to the work site be by special vehicle and that transfer to construction equipment take place where it is unlikely that any spill could reach a watercourse. The Board would require that the Applicant implement these recommendations in the construction contract specifications.

Trans Mountain's crude oil spill contingency plan, combined with the Company's expertise in operating a pipeline within the proposed right-of-way, should be adequate to minimize the extent of a crude oil spill, should one occur.

Should a certificate be issued, the Board would require Trans Mountain to implement its noise emission program as part of the pump station design. In addition, Trans Mountain would be required, during the first winter after start-up, to conduct noise emission surveys to confirm that the noise emission levels met the criteria selected for each station. These surveys would be conducted under representative climatic conditions, i.e. on a clear, cold, dry day, and with the pump stations operating at full capacity, and the Applicant would be required to submit the results of this noise emission survey to the Board.

The recommendations made by Trans Mountain's environmental consultant and accepted by the Applicant, to reduce the impact on the environment of the activities of construction personnel, were that the Applicant would:

- (i) implement an environmental orientation program for construction workers to make them aware of the potential impact their activities would have on the environment;

- (ii) develop an environmental procedures manual to set out the most environmentally acceptable plans and procedures to be carried out by the pipeline contractor; and
- (iii) organize an environmental inspection group to be responsible for enforcing the conditions of any certificate and adherence by the contractor to the Applicant's plans and procedures.

The Board would require the Applicant to implement these programs and procedures prior to the commencement of construction as part of Trans Mountain's design to protect the environment.

Trans Mountain's environmental consultant recommended implementation of a post-construction monitoring program focussing on areas where there was the potential for the development of adverse environmental impact. This monitoring program would allow the Applicant adequate time to implement restoration procedures to mitigate the problems. The Board would require the Applicant to implement these monitoring programs with the addition of a three-year program to monitor crop productivity on agricultural land traversed by the pipeline, and to report its findings to the Board.





CHAPTER 3  
INTERCONNECTING FACILITIES

UPSTREAM

The upstream interconnecting facilities would consist of an offloading crude oil terminal at Low Point, Washington and a connecting pipeline from there to a point on the international boundary near Sumas.

The terminal would consist of two single point mooring systems, unloading lines, and two submarine pipelines connected to on-shore facilities. The mooring systems would be designed for tankers up to the 200 000 DWT class.

The crude oil transfer capacity of the terminal would be  $127.2 \times 10^3 \text{ m}^3/\text{d}$  (800 Mb/d), i.e.  $79.5 \times 10^3 \text{ m}^3/\text{d}$  (500 Mb/d) for the Northern Tier refineries and  $47.7 \times 10^3 \text{ m}^3/\text{d}$  (300 Mb/d) for the refineries in the area of Puget Sound. In order to accommodate this capacity,  $874.5 \times 10^3 \text{ m}^3$  (5 500 Mb) of tankage would be constructed at Low Point and  $175.0 \times 10^3 \text{ m}^3$  (1 100 Mb) of tankage at Burlington in Washington State.

Approximately 238 km (148 miles) of pipeline would be constructed between Low Point and the international boundary. Of this, approximately 212 km (132 miles), from Low Point to Burlington, would be 914 mm (36-inch) diameter and approximately 26 km (16 miles), from Burlington to the international boundary, would be 762 mm (30-inch) diameter. Included in this section of 238 km (148 miles) would be the

8 km (5-mile) underwater crossing of Admiralty Inlet and the three pumping stations located at Low Point, Fairmont and Burlington.

#### DOWNSTREAM

The proposed Trans Mountain pipeline system would utilize both the Interprovincial Pipe Line and the Rangeland/Aurora pipeline systems for transportation of crude oil to the American mid-west.

Hudson's Bay Oil and Gas Company Limited ("Hudson's Bay") indicated that it would be willing to construct a connecting pipeline between Edson and Sundre, Alberta in order to connect the Trans Mountain system to the Rangeland system. Hudson's Bay further indicated that such facilities would require the construction of a 406 mm (16-inch) diameter line and two pumping stations. In addition, 169 km (105 miles) of 406 mm (16-inch) diameter loop would be required on the Rangeland trunk system between Sundre and the commencement of the Aurora Pipe Line near the international boundary. This system would be capable of transporting approximately  $15.9 \times 10^3 \text{ m}^3/\text{d}$  (100 Mb/d) of crude oil from Edson to the international boundary. However, Hudson's Bay stated that, if exchanges of crude oil between Canada and the U.S. were acceptable, it might not be necessary to construct such interconnecting facilities.

The existing Interprovincial system consists of multiple lines of pipe, ranging from 406 mm (16-inch) to 1 219 mm (48-inch) diameter. The system extends from Edmonton, Alberta to Montreal, Quebec, by way of Regina, Gretna, Superior and Chicago, Sarnia and Toronto. Interprovincial estimated that, based on its forecast of 1982-83 pumping requirements, the present system would, at that time, have spare capacity in the order of  $47.7 \times 10^3 \text{ m}^3/\text{d}$  (300 Mb/d) between Edmonton, Alberta and Clearbrook, Minnesota and  $31.8 \times 10^3 \text{ m}^3/\text{d}$  (200 Mb/d) east of Clearbrook to Chicago, Illinois. Interprovincial also stated that it would be prepared to expand its facilities to increase its pumping capacity upon reasonable assurances that the facilities would be used for an extended period.





## CHAPTER 4

### INTERNATIONAL AND MARINE CONSIDERATIONS

While the pipeline in respect of which Trans Mountain seeks a certificate under the NEB Act does not involve any marine facilities in Canada, the crude oils to be transmitted through that pipeline would be shipped by tanker from Alaska and offshore sources to a marine terminal at Low Point on the Strait of Juan de Fuca. From Low Point, the crude oils would then be transported to the international boundary by a pipeline which would connect with the proposed Canadian facilities. The U.S. section of the overall pipeline system includes marine crossings under Admiralty Inlet and Saratoga Passage at the northern end of Puget Sound.

In its decision given on the West Coast Environmental Law Association motion on 18 October 1979, the Board ruled that, although it had no jurisdiction over the tanker traffic and facilities outside Canada, the existence of the proposed oil port in Washington and the movement of crude oil by tanker from Alaska to that port, together with its effects upon existing tanker traffic and potential effects upon the marine and coastal environment, are issues having a bearing upon the overall Canadian public interest in relation to the proposed pipeline in Canada. The Board stated that it considered these matters relevant to its decision on whether to issue a certificate to Trans Mountain for the pipeline in Canada.

With respect to these international issues, Trans Mountain took the position that there were three reasons why the Board could find, for the purposes of the application, that the security of Canada's marine environment has been adequately protected and that the Canadian public interest has been adequately taken into account. The Applicant focused on:

- (i) the presently available indicators as to the effect of the project upon the environment, having regard to existing and foreseen risks;
- (ii) the degree upon which Canada can place reliance upon the work which will be done by U.S. regulatory agencies and government authorities with respect to the U.S. project; and
- (iii) the operation of the proposed certificate conditions, set out in Exhibit 157, whereby the Board would have the opportunity to participate in the review and utilization of marine environmental impact studies.

Trans Mountain further submitted that the various studies done so far in the U.S. suggest that the U.S. project may be designed, constructed and operated in an environmentally acceptable manner, and that it would not necessarily lead to environmentally unacceptable impacts.

TANKER TRAFFIC AND THE TRANS MOUNTAIN PROJECT

At present, approximately  $79.5 \times 10^3 \text{ m}^3/\text{d}$  (500 Mb/d) of ANS crude oil are delivered through the Alyeska pipeline to the port of Valdez for shipment by tanker to the U.S. west coast and, via the Panama Canal, to the U.S. Gulf coast. Of this amount, some  $25.4 \times 10^3 \text{ m}^3/\text{d}$  (160 Mb/d) of ANS crude oil is delivered by tanker through the Strait of Juan de Fuca to two refineries located on Puget Sound in the State of Washington. The refineries in the Puget Sound area are the Atlantic Richfield refinery at Cherry Point, the Mobil refinery at Ferndale and the Shell and Texaco refineries at Anacortes on the northern end of Puget Sound. There are also two small refineries located at Tacoma on the southern end of Puget Sound. In addition to the ANS crude oil, the Puget Sound refineries also take delivery by tanker of some  $26.2 \times 10^3 \text{ m}^3/\text{d}$  (165 Mb/d) of light and high pour point Minas crude oils from offshore sources. The frequency of tanker movements to these refineries is affected by U.S. restrictions on the size of tankers (60,000 tons) which may enter the waters east of Port Angeles and by the capacity of the existing refinery docks.

Trans Mountain Oil Pipe Line Corporation's proposed marine terminal at Low Point would have two single point mooring buoys located at the 20-fathom line offshore in the Strait of Juan de Fuca and connected by two submarine pipelines to storage and pipeline terminal facilities onshore. The mooring buoys would be designed to accommodate tankers of up to 200,000 tons in size.

In October, 1979, Trans Mountain proposed that the U.S. section of the project be expanded from a  $79.3 \times 10^3 \text{ m}^3/\text{d}$  (500 Mb/d) to a  $127 \times 10^3 \text{ m}^3/\text{d}$  (800 Mb/d) operation in order to provide for the connection of the northern Puget Sound refineries. Under this "hook-up" proposal, the pipeline facilities from Low Point would be expanded to permit delivery of ANS and offshore crude oils to the northern Puget Sound refineries at a toll of  $\$0.818 \text{ U.S./m}^3$  ( $\$0.13 \text{ U.S./b}$ ). It appears that the northern Puget Sound refiners are opposed to the hook-up concept because it would increase the overall cost of delivering crude oil to these refineries and would make existing refinery dock facilities redundant. Hook-up, however, would not eliminate all tanker traffic to the Puget Sound refineries. High pour point specialty crude oils would still have to be delivered by tanker to the northern Puget Sound refineries utilizing such crudes and some  $4.8 \times 10^3 \text{ m}^3/\text{d}$  (30 Mb/d) of crude oils to the southern Puget Sound refineries not connected by hook-up.

In September, 1979, a draft bill was submitted to the U.S. Congress to require mandatory hook-up of the Puget Sound refineries. Under the terms of the draft bill, the two refineries at Tacoma would be excluded from the hook-up requirement. A further exception was made in the bill for high pour point specialty crude oils. Subject to those exceptions, the bill would require the northern refineries to execute an agreement to receive their supply of crude oils by pipeline. At this time, it is not



clear that the bill has the necessary support to be passed by Congress.

It was Trans Mountain's position that the hook-up proposal would result in significant environmental benefits. Firstly, it would reduce the number of tankers entering the sensitive waters east of Port Angeles. Secondly, there would be fewer tankers entering the Strait of Juan de Fuca because the Low Point facility could accommodate tankers of a much larger size. The evidence with respect to the size of the tankers that would be engaged in the Alaska and offshore trade, and the age and physical condition of these tankers, was vague and contradictory. Trans Mountain's subsidiary, as the operator of the marine terminal, would have no direct control over the tankers that would deliver crude oil to that terminal. However, there was evidence that tankers discharging crude oils at U.S. ports must meet the requirements of the Jones Act and/or U.S. Coast Guard regulations.

#### VESSEL TRAFFIC MANAGEMENT

Trans Mountain called a witness from the Canadian Coast Guard to give evidence on the regulation of vessel traffic on the west coast of British Columbia. For traffic management purposes, the Coast Guard has divided the west coast into three zones: the Prince Rupert Zone, the Tofino Zone, and the Vancouver Zone. While a traffic plan is currently under study for the Prince Rupert Zone, a Vessel Traffic Management ("VTM") system was

instituted in 1974 for both the Tofino and Vancouver Zones under a cooperative arrangement with the U.S. Coast Guard. Under these arrangements, the Canadian Coast Guard controls vessel traffic in the approaches to the Strait of Juan de Fuca west of Vancouver Island, while the U.S. Coast Guard regulates the traffic in the Strait itself between Cape Flattery and Race Rocks. East of the Strait of Juan de Fuca, the Canadian Coast Guard regulates traffic in Haro Strait and the Straits of Georgia, while the U.S. Coast Guard regulates the traffic in Puget Sound and Rosario Strait. Vessels proceeding east of the Strait of Juan de Fuca are required to take on pilots either at Victoria or at Port Angeles, depending on their destinations.

The purposes of the VTM system are to establish traffic routes for, and two-way communication with, all vessels, to provide radar surveillance and to generally manage traffic so as to enhance vessel safety. At present, compliance with the VTM system is voluntary. Approximately 75 to 80 per cent of the vessels entering the Strait of Juan de Fuca comply with the VTM system and virtually all tankers are complying. It is expected that the U.S. Coast Guard will complete the installation of its radar facilities on the Strait of Juan de Fuca by December 1980. The present plans are to make the VTM system mandatory early in 1981. This would be accomplished by an agreement between the Canadian and U.S. Governments, which would require implementation by legislation to

be passed by the Canadian Parliament and the U.S. Congress. Such legislation would presumably make the VTM system mandatory for Canadian and U.S. vessels and for all vessels within the 19 km (12-mile) limit. To have it considered binding outside that limit by the majority of maritime nations, it would be necessary for Canada and the U.S. to submit the mandatory system to the Inter-Governmental Maritime Consultative Organization ("IMCO") for its approval. It is anticipated that IMCO approval could be obtained within a year.

Within the Strait of Juan de Fuca, the VTM system provides for vessel traffic separation lanes, with inbound traffic in U.S. waters and outbound traffic in Canadian waters. In the approaches to the Strait of Juan de Fuca, a "turning point" has been proposed, which would be located approximately 160 km (100 miles) west of Cape Flattery. It is at this point that vessels would make an alteration of course prior to entering the Strait.

While this turning point is used by U.S. tankers from Valdez, it is not necessarily used, at present, by foreign tankers bringing crude oils from offshore sources.

The Coast Guard witness indicated that the track recommended by the U.S. Coast Guard for tankers moving from Valdez to the turning point is located some 160 to 290 km (100 to 180 miles) west of the coasts of the Queen Charlotte Islands and Vancouver Island. Until tankers reach the turning point, they

would not be subject to the VTM system and would be solely under their masters' control. The witness indicated that, to his knowledge, tankers from Valdez remained well off the west coast. In his view, it would be imprudent for a master to bring his vessel close to the west coast irrespective of weather conditions. Once a vessel enters a VTM zone, the master is still responsible for the safe navigation of his ship.

The question was raised as to whether the existence of the single point mooring buoys off Low Point would require a realignment of the vessel traffic lanes in the Strait of Juan de Fuca. In the Low Point area, the southern limit of the inbound traffic lane is 6.4 km (4 miles) from the shore. The Coast Guard witness stated that he would prefer the traffic lanes to be some 3.2 km (2 miles) from the mooring buoys. From enquiries made by Trans Mountain, it appears that the U.S. Coast Guard would not recommend a change in the traffic lanes in the Low Point area, at this time, although the matter is to be subject to further consideration. There was contradictory evidence presented with respect to the distance that a vessel moored at Low Point would be from the southern edge of the inbound traffic lane, depending upon the direction of winds and tides.

As to the potential hazard of having tankers turning across the inbound traffic lane to moor at Low Point, and crossing that lane to reach the outbound track upon departure, the Coast



Guard witness stated that he saw no problems given proper radar coverage of the area from the U.S. shore. Also, it is standard VTM practice to clear an area of other traffic before maneuvering vessels with hazardous cargoes.

The Coast Guard witness acknowledged that even a mandatory VTM system is not a guarantee against incidents or accidents in the managed area. There is always the possibility of collisions or groundings due to human error, mechanical failure or weather conditions. There was evidence that, during the fishing season, there have been incidents between ships and fishing boats in the Strait of Juan de Fuca and its approaches.

#### U.S. REGULATORY REQUIREMENTS

In the U.S., the Trans Mountain project is subject to both federal and state regulatory requirements.

At the federal level, the regulatory procedures respecting a west-to-east crude oil transportation system are partly governed by Title V of the Public Utilities Regulatory Policies Act of 1978 ("PURPA") as noted in Chapter 1. The President's decision under PURPA does not constitute a final approval for any particular project; it merely provides for expedited permitting procedures. Moreover, the various U.S. federal agencies may still approve projects other than a project which has been selected for expedited permitting under PURPA.

Title V of PURPA, at present, does not apply to state regulatory processes, with the result that state approvals cannot be expedited by the President. Apparently, the U.S. Congress can pre-empt the state regulatory process and some members of Congress have proposed legislation to expedite state permitting procedures for west-to-east oil pipeline projects.

For the purposes of the President's decision under Title V of PURPA, various U.S. federal agencies have studied the different projects to move crude oils to the Northern Tier. The Department of the Interior has acted as the lead agency for these studies. In October 1979, the Secretary of the Interior recommended to the President that he should choose the Northern Tier Project for the purposes of expedited regulatory procedures. The Secretary further recommended that, if Northern Tier is not able to demonstrate adequate financial support within one year, the Title V special procedures should be revoked and Trans Mountain should be given the opportunity to take advantage of those procedures and secure financing. In the Secretary's opinion, the Trans Mountain proposal offered the most attractive alternative to the Northern Tier project, provided approval of that system is conditioned on mandatory hook-up of the northern Puget Sound refineries.

The Northern Tier project requires more U.S. permits than the Trans Mountain proposal, because the Northern Tier project traverses a much larger area in the U.S. For this reason,

Trans Mountain indicated that it believed it could complete U.S. federal permitting procedures early in 1981 even without expedited permitting.

For the purposes of federal permitting, the U.S. Army Corps of Engineers would act as the lead agency and would prepare an environmental impact statement. At the time of the hearing, Trans Mountain had not filed its application with the Corps of Engineers, but anticipated doing so shortly. The outlook is that, even with a public hearing, the Corps of Engineers' decision could be expected within six months.

In addition, Trans Mountain would be required to comply with U.S. Coast Guard regulations respecting port facilities and procedures for the transfer of crude oils from tankers. While no permit is required, Trans Mountain's operating procedures must be filed with the U.S. Coast Guard for approval prior to commencing operation of the terminal. With respect to the onshore storage facilities, the U.S. Environmental Protection Agency requires the filing of a spill prevention and countermeasures plan. That agency has no formal permitting process.

In the State of Washington, the Trans Mountain project would require the approval of the Energy Facilities Site Evaluation Council ("EFSEC"). Trans Mountain had filed a summary application with EFSEC, and contemplated filing its completed application by 18 January 1980. The application to EFSEC is

based on the hook-up proposal. Under EFSEC procedures, there are two hearings. The first hearing, which may be held in advance of the filing of a completed application, is to determine whether the project is consistent with local land use and zoning codes. That hearing was scheduled for November and December, 1979, for the Trans Mountain project. Once the completed application is filed, EFSEC arranges for an outside consultant to prepare an environmental impact statement. This statement is expected to be completed by April or May, 1980, after which time EFSEC would proceed with its principal hearing on the project. Trans Mountain anticipated it might have a final decision from EFSEC by late 1980.

At the state level, it appears that EFSEC is intended to be a "one-step" permitting procedure, and that EFSEC can pre-empt county land use requirements.

It was not clear from the evidence to what extent U.S. federal agencies would consider the potential effects of the proposed U.S. project on the Canadian marine environment. At the state level, EFSEC has instructed Trans Mountain to restrict its studies to the impacts on Washington.

#### THE MARINE AND COASTAL ENVIRONMENT IN CANADA

Trans Mountain had not undertaken studies of the impact of the U.S. project and tanker traffic on the Canadian marine and coastal environment. Under the conditional certificate concept advocated by the Company, it proposed to undertake these studies



and file them after the Board had issued a conditional certificate. It was Trans Mountain's position that if these studies disclosed unacceptable environmental impacts associated with the U.S. project and the tanker traffic, then the Company would not proceed with the project. The Company also indicated it would not start construction of any part of the overall project until all Canadian and U.S. regulatory approvals had been acquired.

Trans Mountain submitted a summary outlining the various studies it would undertake to assess the impacts upon both the Canadian and U.S. marine environment, along the entire traffic route from Valdez to Low Point, with the primary focus being on the Strait of Juan de Fuca. The studies would identify the various resources placed at risk, assess the potential impacts and recommend mitigative measures. It was indicated that the mitigative measures might require changes in the U.S. project. Trans Mountain's policy witness on marine matters suggested that the Company's conditional certificate proposal provided a method whereby the Board could enforce Canadian requirements upon the U.S. project to mitigate potential marine impact in Canada. Trans Mountain proposed that its right to construct the pipeline in Canada be conditioned upon its filing evidence that the design and methods of constructing and operating the U.S. project would mitigate, to the Board's satisfaction, the impact of the U.S. project on the marine resources of Canada.

Considerable evidence was presented by intervenors on the potential impacts the tanker traffic and the U.S. project would have on the Canadian marine and coastal environment. There are substantial fishing resources on the west coast and fishing constitutes a major industry in British Columbia. Indian tribes along the British Columbia coast and various rivers are dependent on fishing for both subsistence and commercial purposes. There is a substantial tourist industry based on the coastal waters. These waters are also used by residents of the area for sport fishing and other recreational purposes. In addition to risks of oil spills, concern was expressed regarding potential air pollution in Canada from the marine terminal and the purging of tankers. There was also concern that the submarine pipeline crossings at the northern end of Puget Sound represented a further potential environmental hazard.

A substantial amount of time in the hearing was devoted to consideration of three studies which purported to compare the degree of biological and navigational risk associated with various west-to-east crude oil transportation proposals, in comparison with each other and with the existing levels of tanker traffic. All of these studies involved the assigning of numerical values to the various risks assessed, and the ranking of the projects on the basis of the number of tanker movements associated with each.

VIEWS OF THE BOARD

While a substantial part of the hearing was devoted to the marine and international aspects of the Trans Mountain application, much of the evidence presented is of little assistance to the Board in assessing the potential impact of the tanker traffic and the U.S. project upon the marine and coastal environment in Canada.

The VTM system, since being implemented in 1974 on a voluntary basis, appears to have reduced the frequency of vessel incidents in the coastal waters off southern British Columbia. Should the system become mandatory in 1981 as planned, it would no doubt further enhance vessel safety in these waters. However, it could not be expected to guarantee that spills will never occur in these waters.

The evidence presented indicates the substantial Canadian interests which may be at risk from existing tanker traffic, the Trans Mountain project and any similar proposal for an oil port in this area. In the absence of any studies concerning the degree of impact and the possible mitigative measures, it is not possible for the Board to assess adequately whether the environmental impact of the tanker traffic and Trans Mountain's project are acceptable from the Canadian viewpoint. The comparative studies presented at the hearing are not adequate to assess the environmental acceptability of the Trans Mountain project in relation to the Canadian public interest, particularly in light of the contradictory evidence of tanker traffic frequency.

While the different U.S. regulatory bodies will no doubt subject the Trans Mountain project to an intensive review, the evidence is not clear as to the degree to which specific Canadian interests would be reviewed and protected as a part of those processes. From the evidence presented, it appears that these reviews cannot be completed and the required U.S. approvals obtained for its project prior to the first quarter of 1981.

In the Board's view, the principal issue was whether the operation of the conditional certificate proposed by Trans Mountain was an appropriate means of ensuring the protection of the Canadian marine and coastal environment.



## CHAPTER 5

### DECISION

Trans Mountain has applied for a certificate under section 44 of the NEB Act in respect of the proposed pipeline in Canada extending from the international boundary near Sumas, Washington, to Edmonton, Alberta.

The overall project proposed by Trans Mountain is international in scope. The project involves the shipment of crude oil by tanker from Alaska and offshore sources to an oil port in the State of Washington for transmission by pipeline through Canada for ultimate delivery to the landlocked Northern Tier states. The unique feature of this application is that the operation of a crude oil port outside Canada and its associated tanker traffic, both of which are beyond the Board's jurisdiction, could have a significant impact on the marine and coastal environment in Canada. In the Board's view, those impacts affect the overall Canadian public interest in relation to the proposed pipeline in Canada, and are matters relevant to its decision whether to issue a certificate to Trans Mountain.

The Board has examined the evidence adduced at the hearing on all the matters relevant to its decision. With respect to the proposed pipeline in Canada, the Board has concluded:

1. There should be adequate supplies of crude oil available to the pipeline to maintain the projected throughput for the economic life of the line. Any shortfall in the supply of Alaska North Slope crude oil during the period after 1985 could be met by additional supplies from offshore sources.
2. Sufficient markets exist in the Northern Tier, the U.S. mid-west and western New York to substantiate the throughput forecasts. The Trans Mountain project would provide a direct and low-cost means of delivering Alaska North Slope and offshore crude oils to those markets.
3. The route of the pipeline on Trans Mountain's existing right-of-way, and to the deviations described in the evidence, are satisfactory.
4. The design of the proposed pipeline is adequate having regard to the proposed throughputs and anticipated operating conditions.
5. The cost estimates for the pipeline in Canada are proper and reasonable. Provided Trans Mountain obtains the necessary throughput and/or deficiency agreements from the shippers or consignees of the crude oils to be transported through the pipeline, Trans Mountain should be able to obtain the

necessary financing to construct the pipeline on the basis of the financing plan described in the evidence.

6. The pipeline in Canada could be constructed without causing any significant socio-economic problems, and the project would result in economic benefits to the area traversed by the pipeline.
7. The project would provide positive net economic benefits to Canada and would involve substantial Canadian content, although not necessarily as high a degree of Canadian content as forecast by Trans Mountain.
8. The pipeline in Canada could be constructed in a manner that could satisfy environmental concerns, given the implementation of effective mitigative measures including appropriate scheduling of pipeline construction.
9. The upstream facilities proposed by Trans Mountain's subsidiary in the State of Washington are adequate to deliver the required volume of crude oil to the pipeline in Canada. Downstream, the Interprovincial and Rangeland/Aurora pipelines would provide sufficient capacity to ensure delivery to the American mid-west.

In summary, the Board is satisfied on all matters related to the construction and operation of the section of the pipeline in Canada for which certification is sought. Accordingly, had there not been the unique marine environmental considerations discussed in Chapter 4, the Board would have been prepared to issue a certificate.

However, there remains the matter of the potential impacts of the U.S. part of Trans Mountain's project, and its associated tanker traffic, upon the marine and coastal environment in Canada. Given the presently available information and the absence of any studies on the degree of these impacts and possible mitigative measures, the Board has concluded that there is not sufficient evidence before it to assess the acceptability of the environmental risks to Canada. Moreover, there is no basis upon which the Board can conclude that the Canadian public interest will be adequately protected by the U.S. regulatory authorities having jurisdiction over the U.S. project and the associated tanker traffic. The issue thus becomes whether the conditional certificate proposed by Trans Mountain is an appropriate means for ensuring the protection of Canadian marine and coastal environment. Under this proposal, Trans Mountain would file its marine environmental studies and the Board would determine the acceptability of the environmental risks after a certificate had been issued for the project.



Section 44 of the NEB Act provides that the Board may, with the approval of the Governor in Council, issue a certificate in respect of a pipeline if it is satisfied that the line is and will be required by the present and future public convenience and necessity. The section further provides that, in considering an application for a certificate, the Board ". . . shall take into account all such matters as appear to it to be relevant . . ."

The Board considers the impacts of the U.S. part of Trans Mountain's project, and its associated tanker traffic, upon the marine and coastal environment in Canada to be relevant to the decision of whether to issue a certificate to Trans Mountain for the pipeline in Canada. In the absence of sufficient evidence upon which the Board can assess the acceptability of these impacts, the Board is unable to take that matter into account in formulating its opinion as to the public convenience and necessity in this case. For this reason, the Board has concluded that the conditional certificate proposed by Trans Mountain is not an appropriate means of dealing with the issue of the Canadian marine and coastal environment.

Section 17 of the NEB Act provides that the Board may rehear any application before deciding it. In the circumstances of this case, the Board considers it


appropriate to permit Trans Mountain to have the opportunity for a rehearing of its application. Such a rehearing, however, would be limited to evidence and submissions respecting the impacts of the U.S. project and the associated tanker traffic upon the Canadian marine and coastal environment. If Trans Mountain elects to proceed with such a rehearing, the Board would postpone its decision on whether the proposed pipeline in Canada is required by the present and future public convenience and necessity until the conclusion of those proceedings.

The Board requires that Trans Mountain advise it and the intervenors of record, on or before 31 March 1980, whether the Company wishes to proceed to a rehearing of its application on the Canadian marine environment issues.

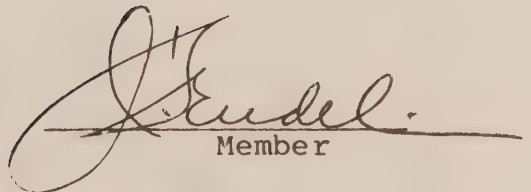
In the event that Trans Mountain advises the Board that it does not wish a rehearing, then the Board will at that time dismiss the Trans Mountain application.

If Trans Mountain elects to proceed to a rehearing, the studies which it conducts should be those necessary to assess the potential incremental impacts of the proposed overall project on the Canadian marine and coastal environment, in the context of the existing and likely oil terminal facilities in the Strait of Juan de Fuca and Puget Sound areas and the associated tanker traffic to these facilities, now and in the future. The Board considers it

appropriate that the Company file the results of its studies and its evidence by the end of August 1980, for the purposes of a rehearing in the fall of 1980.

  
Presiding Member

  
Member

  
Member

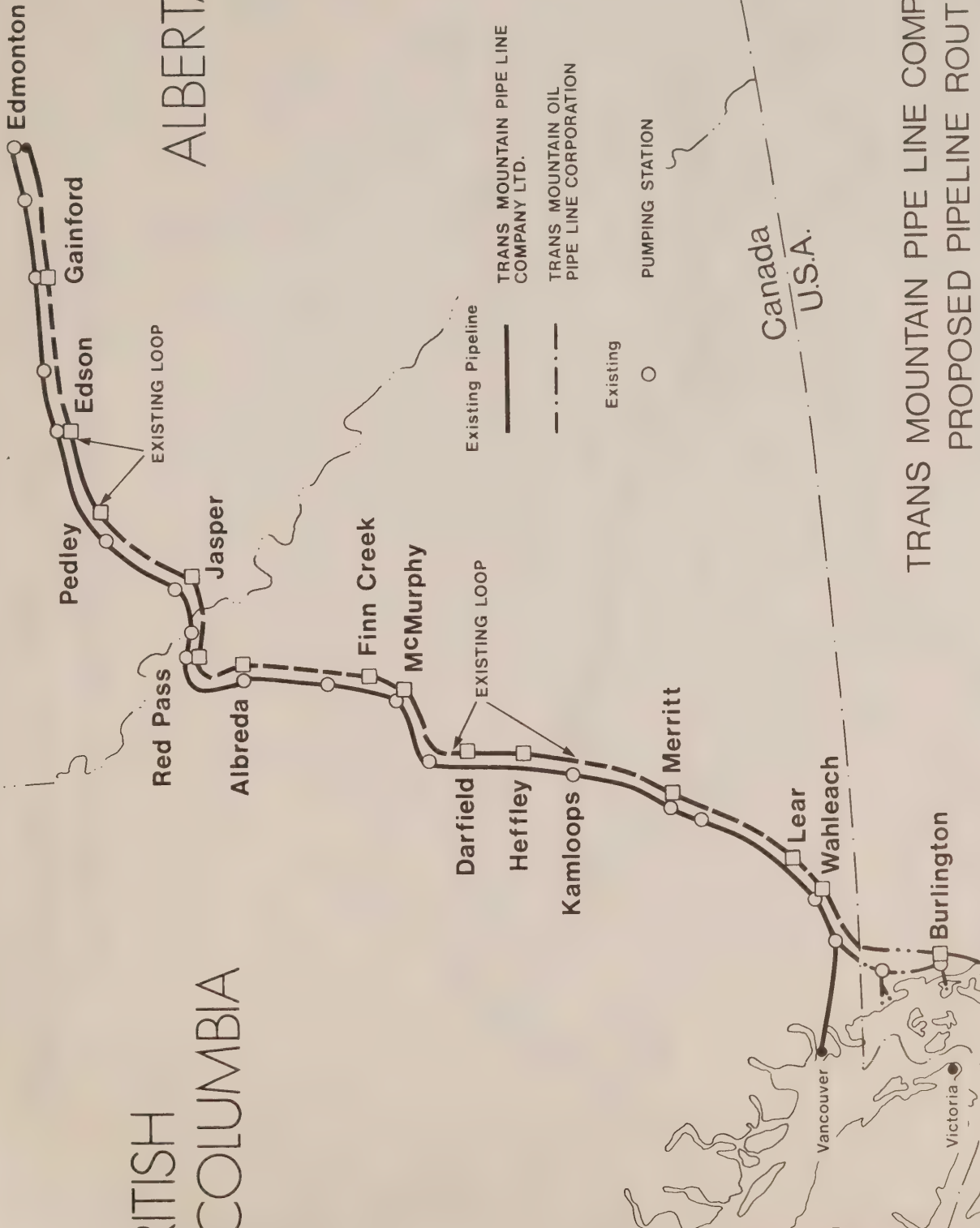
Ottawa, Canada  
January 1980.





BRITISH  
COLUMBIA

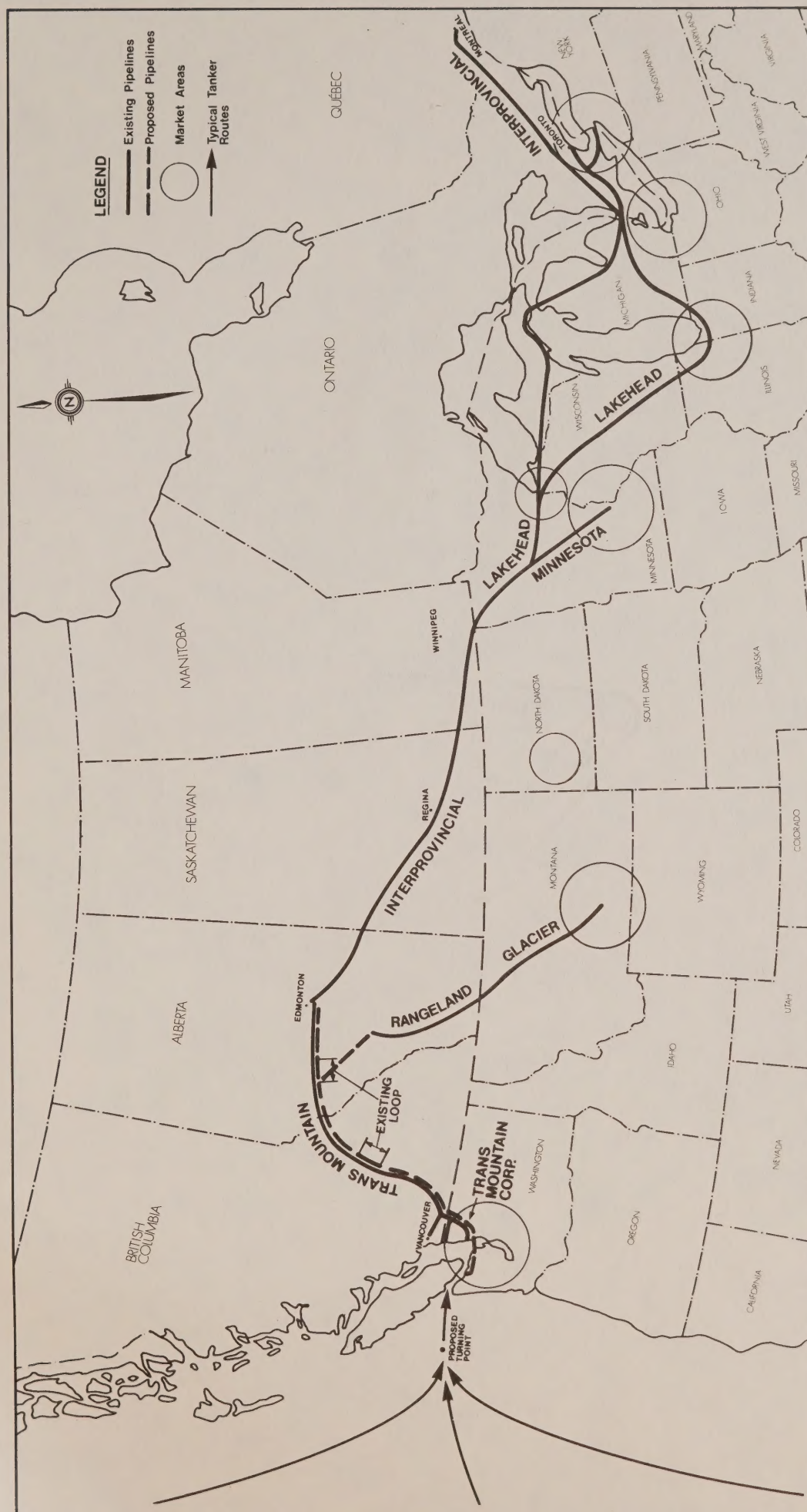
ALBERTA



TRANS MOUNTAIN PIPE LINE COMPANY LTD.  
PROPOSED PIPELINE ROUTE



# TRANS MOUNTAIN PIPE LINE COMPANY LTD. SUPPLY & MARKET OVERVIEW



DWG. NO. 1131-M

NATIONAL ENERGY BOARD, 27 NOV. 79

# СТУДИЯ ИСКУССТВ И НАУКИ ИСКУССТВ И НАУКИ

